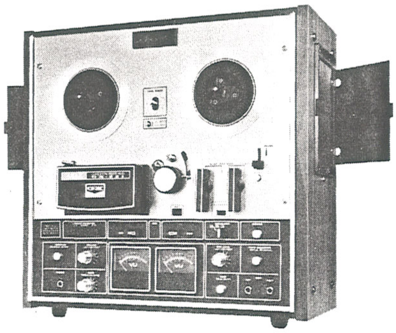
MODEL GX-225D



MODEL GX-221

STEREO TAPE DECK

MODEL GX-225D

ALSO APPLICABLE TO MODEL GX-221 STEREO TAPE
RECORDER AND GX-221D STEREO TAPE DECK

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SECTION 1

SERVICE MANUAL

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I. SPECIFICATIONS

An asterisk next to a figure indicates the minimum guaranteed performance.

TRACK SYSTEM		4 track 2 channel stereo/monaural system
REEL CAPACITY		Up to 7″ reel
TAPE SPEED		7-1/2 ips(19 cm/sec.) ±0.7%(*±0.8%)
		3-3/4 ips(9.5 cm/sec.) ±0.7%(*±0.8%)
		1-7/8 ips(4.75 cm/sec.) ±0.7%(*±0.8%)
WOW AND FLUTTER		Less than 0.08%(*0.12%) R.M.S. at 7-1/2 ips
		Less than 0.12%(*0.25%) R.M.S. at 3-3/4 ips
		Less than 0.20%(*0.4%) R.M.S. at 1-7/8 ips
FREQUENCY RESPONSE		
	AKAI S.R.T. Tape	30 to 25,000 Hz ±3 dB at 7-1/2 ips
		30 to 20,000 Hz ±3 dB at 3-3/4 ips
		30 to 10,000 Hz ±3 dB at 1-7/8 ips
	Regular Tape	30 to 23,000 Hz(*30 to 22,000 Hz) ±3 dB at 7-1/2 ips
		30 to 19,000 Hz(*30 to 18,000 Hz) ±3 dB at 3-3/4 ips
		30 to 9,000 Hz(*40 to 9,000 Hz) ±3 dB at 1-7/8 ips
SIGNAL TO NOISE RATIO		Better than 50 dB(53 dB with N.R. process)
		* Better than 48 dB at 7-1/2 ips
		* Better than 47 dB at 3-3/4 ips
		* Better than 45 dB at 1-7/8 ips
		* Better than 44 dB at Reverse Mode
HUM AND NOISE		5 mV Tone Control and Main Volume: Min.
		(Model GX-221 only)
DISTORTION FACTOR		Less than 1.5%(*3%) at 1,000 Hz "0" VU Recording
TONE CONTROLS	Treble	12 ±2 dB(Max.) and −14 ±2 dB(Min.) at 10 kHz
	Bass	12 ±2 dB(Max.) and −10 ±2 dB(Min.) at 100 Hz
		(Model GX-221 only)
CROSS TALK		Better than 65 dB(*58 dB) monaural
		Better than 50 dB(*43 dB) stereo
ERASE RATIO		Better than 70 dB
BIAS FREQUENCY		100 kHz ± 5%
BIAS LEAK		Less than −20 VU
HIGH FREQUENCY DEVIATION		
	Between Channels	Within 2 dB, using an 8,000 Hz 3-3/4 ips recorded tape at 7-1/2 ips
	Between FWD/REV	Within 3 dB, using an 8,000 Hz 3-3/4 ips recorded tape at 7-1/2 ips
REC./P.B. LEVEL		4 ± 1.5 dB
INPUTS	Mic Input	0.2 mV(*0.4 mV) Impedance: 10 kΩ
	Line Input	50 mV(*60 mV) Impedance: 150 kΩ
	Din Input	2 mV(low) and 50 mV(*60 mV) (high)
OUTPUTS	Line Output	1.228V (4 ± 1 dB) Impedance: 20 kΩ
	Din Output	0.4V
	Speaker Output	30 W total music power at 8Ω (GX-221 only)
		20 W continuous power at 8Ω (GX-221 only)
HEAD PHONE OUTPUT		30 to 40 mV at 8Ω
REVERSING TIME		2 to 6 sec.
FAST FORWARD AND REWIND TIME		85/65 sec., using a 1,200 ft. tape at 50/60 Hz
MOTORS	Main Motor	3 speed hysteresis synchronous motor
		Type: HC-16X
		Revolutions: 3,000/1,500/750 r.p.m.(50 Hz)
		3,600/1,800/900 r.p.m.(60 Hz)
	Reel Motor	Two 6-pole eddy current outer rotor motors
		Type: 24XO-MR
		Revolutions: 930 r.p.m. (50 Hz)
		1,120 r.p.m. (60 Hz)
HEADS	Erase Head	Type: E4-250
		Gap: 0.6 mm
		Impedance: 195Ω ± 10% at 100 kHz.
		D.C. Resistance: 3.5Ω

Recording Head	Type: R4-200	
	Gap: 4μ ± 15%	
	Impedance: 1,870Ω at 100 kHz	
	D.C. Resistance: 8Ω	
Playback Head	Type: P4-200	
	Gap: 1.75μ ± 15%	
	Impedance: 3 ± 1 kΩ at 1 kHz	
	D.C. Resistance: 500Ω	
I.C.	LD3141 . . . 2	STK015 . . . 2(GX-221 only)
TRANSISTORS	2SC372(Y) . . . 1	2SC971(2)(3) RED . . . 2
	2SC871(F) . . . 12	2SC1211(C)(D) . . . 1
	2SC945(Q)(R) . . . 6	2SD223(G)(Y) . . . 1
	2SC968(3)(4) . . . 3	
	2SC458LG(C) . . . 6	2SC711(E) . . . 4
	(N.R. Amp.)	(N.R. Amp.)
DIODES	1N34A . . . 7	5B2 . . . 1(GX-221 only)
	10D1 . . . 3	WZ-240 . . . 1
	10D4 . . . 1	
	WG-599 . . . 4(N.R. Amp.)	
POWER SUPPLY	100 to 240 V A.C. 50/60 Hz	
POWER CONSUMPTION	90W Models GX-225D, GX-221D	
	135W Model GX-221	
INSULATION RESISTANCE	More than 50 MΩ	
INSULATION DURABILITY	500V D.C. for more than 1 min. duration.	
DIMENSIONS	430(W) x 425(H) x 230(D) mm (17.2" x 17" x 9.2")	
WEIGHT	20.5 kg(45.1 lbs.) Models GX-225D, GX-221D	
	22.5 kg(49.5 lbs.) Model GX-221	

NOTE: Specifications subject to change without notice.

II. MEASURING METHOD

1. TAPE SPEED DEVIATION

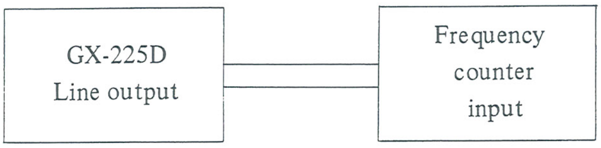

GX-225D
Line output
Frequency counter input

Fig. 1

As shown in Fig. 1, connect a Frequency Counter to the Line output. Playback a 1,000 Hz pre-recorded test tape. Take a frequency counter reading at the beginning, middle, and end of tape winding during playback. The maximum value of these respective readings will represent tape speed deviation.

2. WOW AND FLUTTER

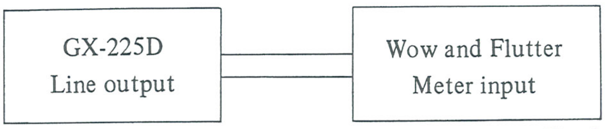

GX-225D
Line output
Wow and Flutter
Meter input

Fig. 2

Method A

As shown in Fig. 2, connect the Line output to the Input of a Wow and Flutter Meter. Playback a 3,000 Hz pre-recorded test tape and take a wow and flutter meter reading at the beginning, middle, and end of tape winding. The maximum value of these respective readings will represent the wow and flutter.

Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a blank tape at the beginning, middle, and end of tape winding. Rewind and playback the resultant signal. Measure wow and flutter with a Wow and Flutter Meter. (The wow and flutter value of Method B will be close to twice that of Method A.)

3. FREQUENCY RESPONSE

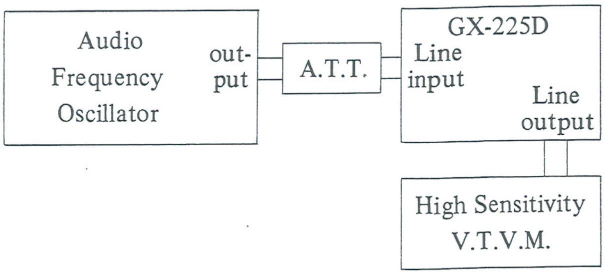

Audio Frequency Oscillator
out-put
A.T.T.
GX-225D
Line input
Line output
High Sensitivity V.T.V.M.

Fig. 3

For measuring frequency response, connect instruments as shown in Fig. 3 and proceed as follows:

1) Supply a 1,000 Hz sine wave to the Line input from an Audio Frequency Oscillator through an Attenuator.
2) Set recorder to recording mode and turn recording level control volume and line output level control volume to maximum. Adjust attenuator to obtain a +4 dB V.T.V.M. reading.
3) Under conditions described in 2) above, re-adjust attenuator so that the Line Output is −16 dB, and record 30 to 22,000 Hz at 7-1/2 ips spot frequencies.
4) Rewind the tape and playback from the beginning. Take V.T.V.M. spot frequency readings and plot values on a graph.

NOTE: When measuring frequency response, new tape should be used.

4. SIGNAL TO NOISE RATIO

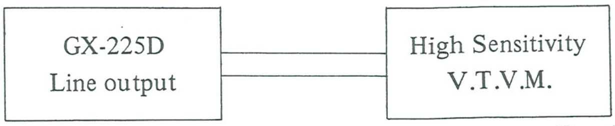

GX-225D
Line output
High Sensitivity
V.T.V.M.

Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output. Playback a 250 Hz "0" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

5. TOTAL HARMONIC DISTORTION FACTOR

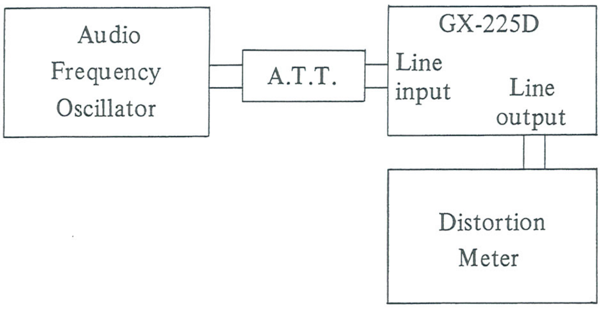


Fig. 5

Connect the measuring instruments as shown in Fig. 5 and record a 1,000 Hz sine wave signal at "0" VU. Playback the resultant signal and measure the overall distortion factor. Measure the noise level of the tape recorder without the tape. Connect the audio frequency oscillator directly to the distortion meter for measurement of the distortion factor of the oscillator. The required distortion factor can be obtained from the results of the above measurement by the following formula:

$$d_0 = d - d_1 - d_2$$

where, d_0 = Required distortion factor
d = Overall distortion factor
d_1 = Noise level
d_2 = Distortion factor of the oscillator

NOTE: When measuring the distortion factor, new tape should be used.

6. CROSS TALK
(Cross talk between the channels)

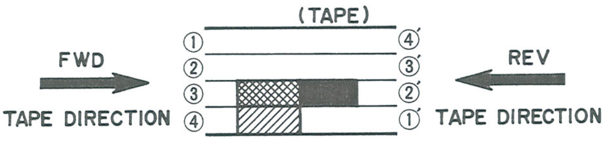


Fig. 6

As shown in Fig. 6, first record a 1,000 Hz sine wave signal on Track No. 3 at +3 VU level. Next, record under a non-input condition. Then, playback the tape on Tracks No. 3 and 4 (reversed condition of tape) through the B.P.F. (band pass filter sensitivity . . . 1:1) and obtain a ratio between the two from the following formula:

$$C = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

where, C = Desired cross talk ratio (dB)
E_0 = 1,000 Hz signal output level ■
E_2 = 1,000 Hz cross talk level ▨
E_1 = Non-input signal recorded level ▩

Fig. 7

7. ERASE RATIO

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line ouput. Playback a virgin tape and take a V.T.V.M. reading of the output level. Next, record a 1,000 Hz sine wave signal at +3 VU, then playback this recorded signal and take a V.T.V.M. reading of the output level. Next, using this pre-recorded tape, record under a non-input condition and take a reading of the noise level output of the erased signal and obtain a ratio between the two from the following formula:

$$Er = 20 \log \frac{E_0}{E_2 - E_1} \text{(dB)}$$

where, Er = Desired erase ratio (dB)
E_0 = 1,000 Hz signal output level
E_2 = Non-input signal recorded level
E_1 = Virgin tape noise output level

8. POWER OUTPUT (GX-221 only)

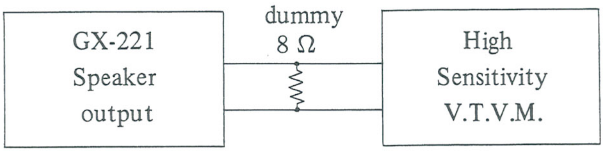


Fig. 8

As shown in Fig. 7, connect an 8Ω dummy load resistor to the speaker output and connect this terminal to a High Sensitivity V.T.V.M. Playback a 250 Hz "0" VU pre-recorded test tape and take a V.T.V.M. reading of the output level. The resultant output can be obtained from the above measurement by using the following formula:

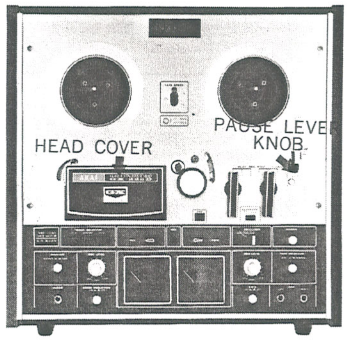
$$P = \frac{E^2}{R} \text{ (W)}$$

where, P = Desired power output (watts)
E = Measured voltage (R.M.S.)
R = 8Ω

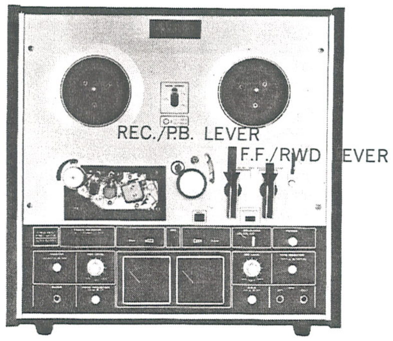
III. DISMANTLING OF UNIT

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Reassemble in reverse order.

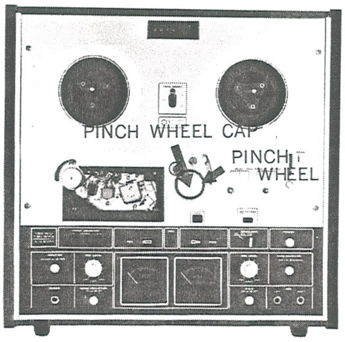
1


HEAD COVER
PAUSE LEVER KNOB.

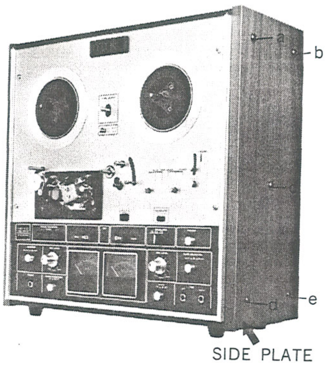
2


REC./P.B. LEVER
F.F./RWD LEVER

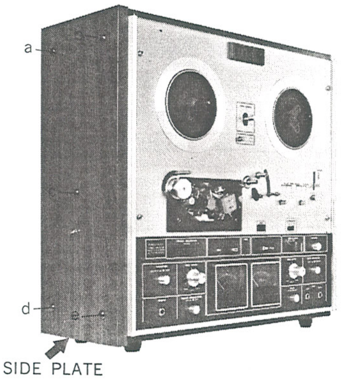
3


PINCH WHEEL CAP
PINCH WHEEL

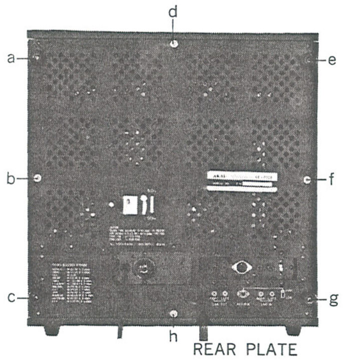
4


a
b
d
e
SIDE PLATE

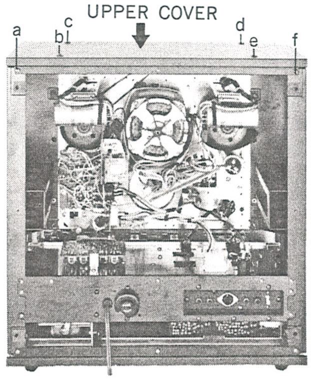
5′


a
d
e
SIDE PLATE

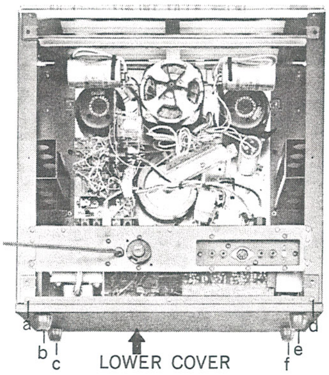
6


d
a
e
b
f
c
g
h
REAR PLATE

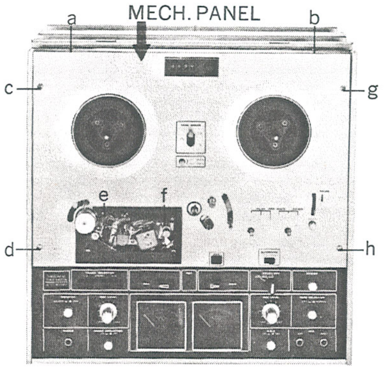
7


UPPER COVER
a
b
c
d
e
f

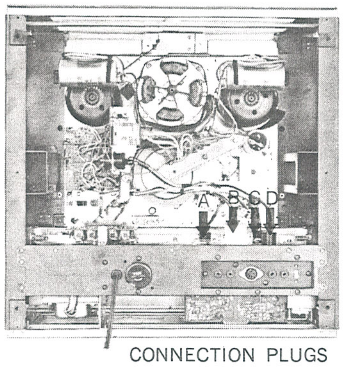
8


a
b
c
LOWER COVER
d
e
f

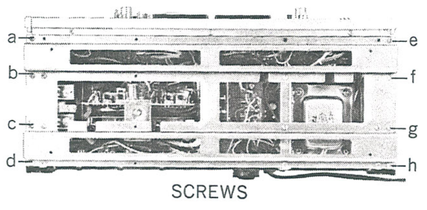
9


a
MECH. PANEL
b
c
g
e
f
i
d
h

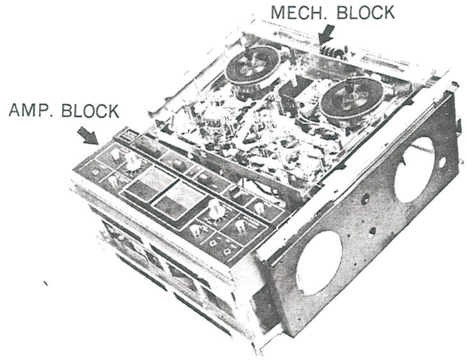
10


A
B
C
D
CONNECTION PLUGS

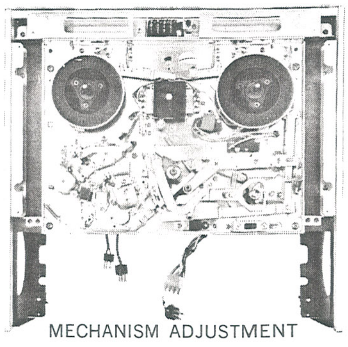
11


a
b
c
d
e
f
g
h
SCREWS

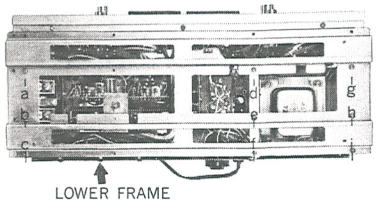
12


MECH. BLOCK
AMP. BLOCK

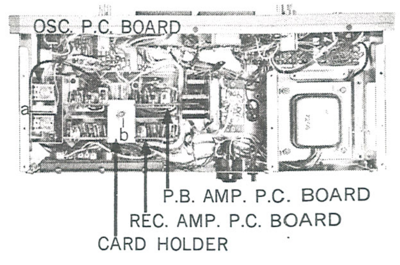
13


MECHANISM ADJUSTMENT

14


a
b
c
d
e
g
h
LOWER FRAME

15


OSC. P.C. BOARD
a
b
P.B. AMP. P.C. BOARD
REC. AMP. P.C. BOARD
CARD HOLDER

IV. TRANSPORT MECHANISM

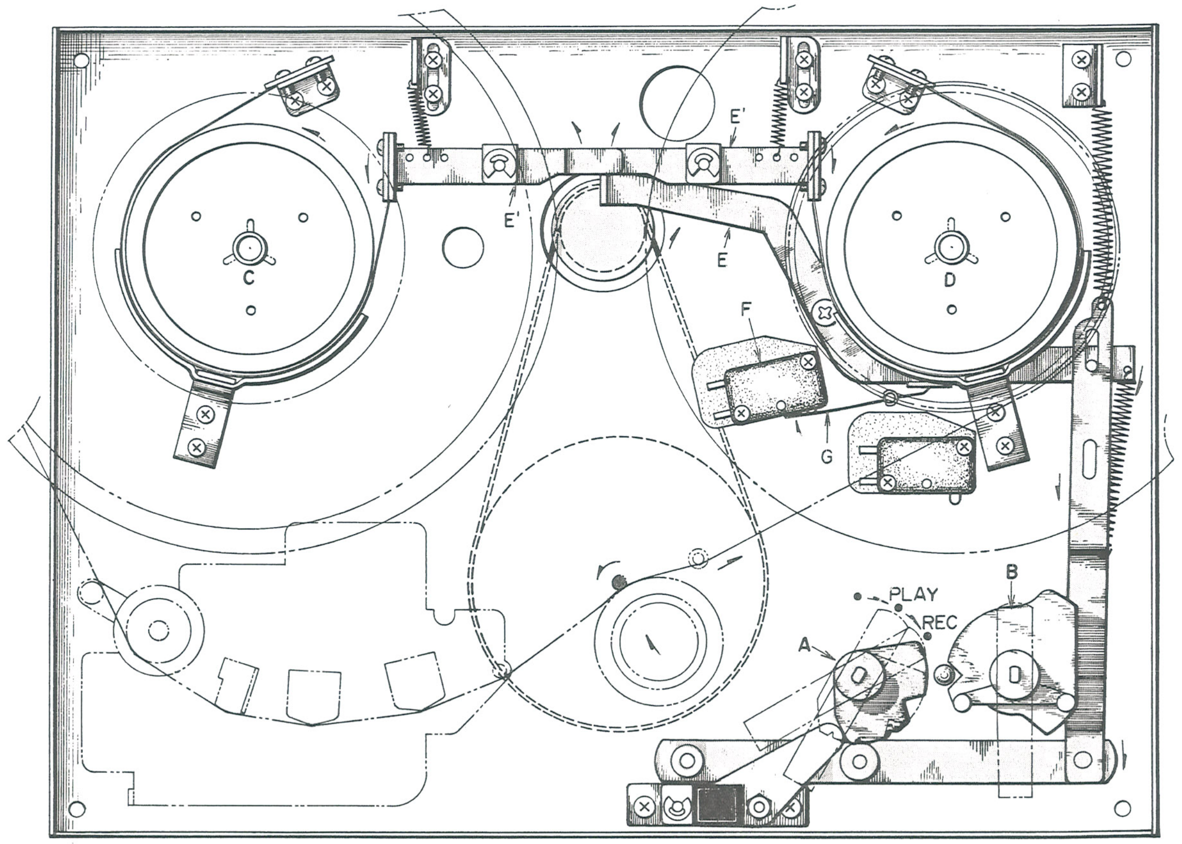

E'
E'
E
C
D
F
G
PLAY
REC
A
B

Fig. 9 FWD P.B./RECORDING REVERSE MODE

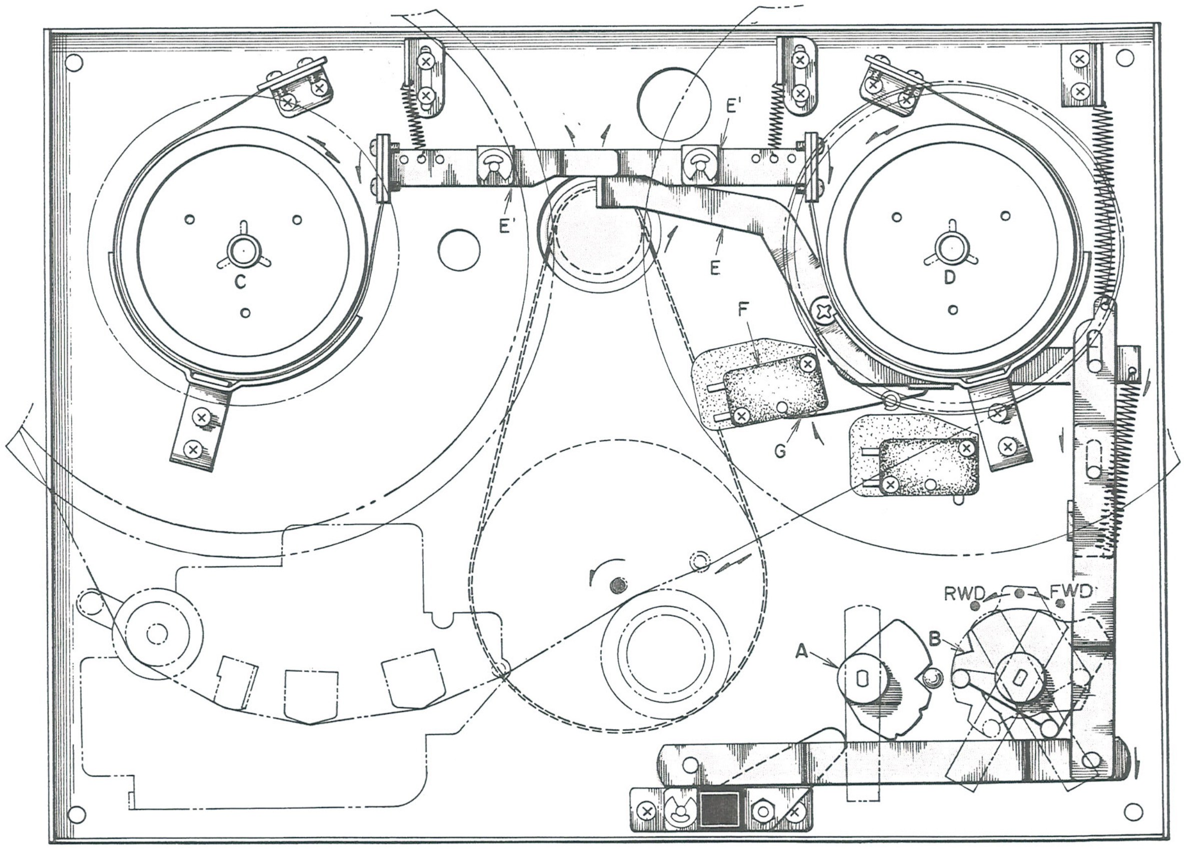

E'
E'
E
C
D
F
G
RWD
FWD
A
B

Fig. 10 F.FWD/RWD MODE

1. FORWARD PLAYBACK RECORDING MODE (Refer to Fig. 9)

Setting Recording/Playback lever (A) to playback position causes brake lever (E') to move in the direction of the arrow and release the brake of both torque motors, and at the same time, operation micro switch (SW-006) is turned ON by lever (G), and the torque motors begin to rotate in the direction of the arrows. Also the capstan contacts the pinch roller and the tape is transported at constant speed.

2. FAST FORWARD/REWIND MODE (Refer to Fig. 10)

1) Setting Fast Forward/Rewind lever (B) to Fast Forward or Rewind position causes brake lever (E') to move in the direction of the arrow, and release the brake of both torque motors, and at the same time, operation micro switch (SW-006) is turned ON by lever (G) and the torque motors begin to rotate in the direction of the arrows.
2) For fast forward or rewind, the mechanical operation is the same, but the voltage supply is different at each mode. (Refer to Chart 2)

3. BLOCK DIAGRAM OF VOLTAGE SUPPLY CIRCUIT TO MOTOR AT EACH MODE

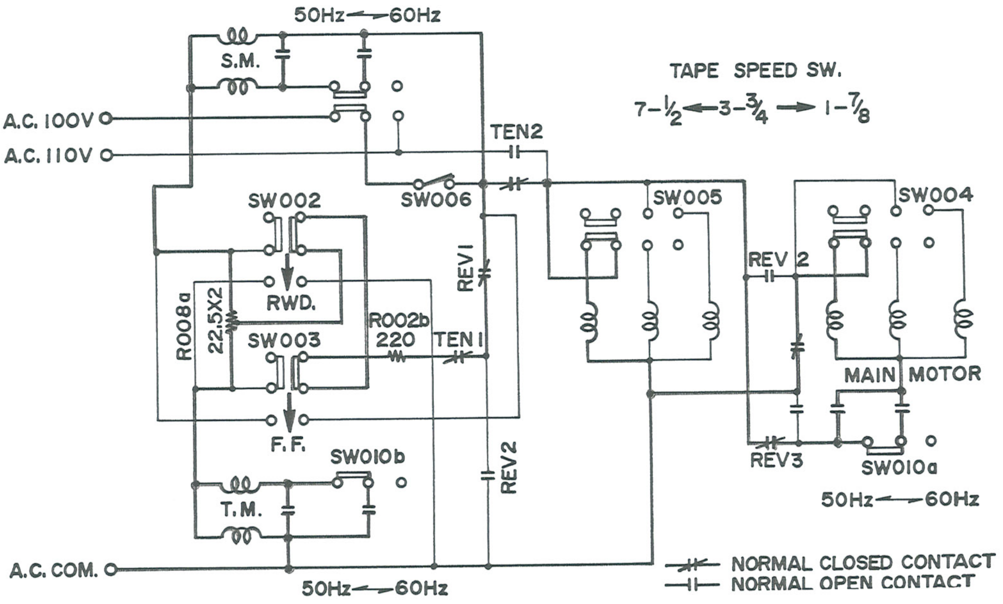

50Hz⟵⟶60Hz
S.M.
A.C. 100V
A.C. 110V
TEN2
SW002
SW006
REV1
RWD.
R008a
22.5X2
R002b
220
SW003
TEN1
F.F.
SW010b
REV2
T.M.
A.C. COM.
50Hz⟵⟶60Hz
TAPE SPEED SW.
7-½⟵3-¾⟶1-⅞
SW005
SW004
REV 2
MAIN MOTOR
REV3
SW010a
50Hz⟵⟶60Hz
NORMAL CLOSED CONTACT
NORMAL OPEN CONTACT

Fig. 11 NORMAL PLAYBACK MODE

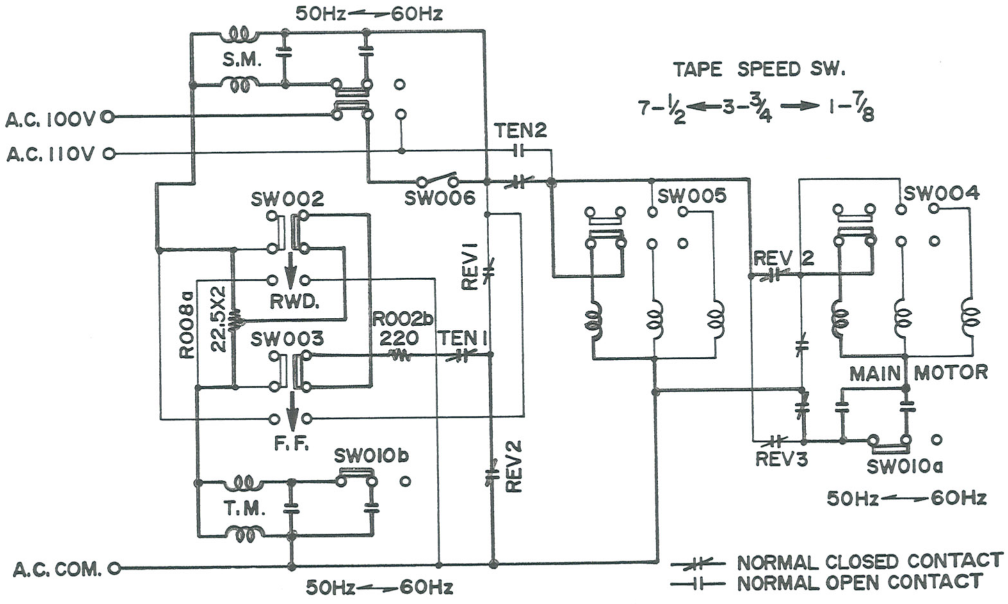

50Hz⟵⟶60Hz
S.M.
A.C. 100V
A.C. 110V
TEN2
SW002
SW006
REV1
RWD.
R008a
22.5X2
R002b
220
SW003
TEN1
F.F.
SW010b
REV2
T.M.
A.C. COM.
50Hz⟵⟶60Hz
TAPE SPEED SW.
7-½⟵3-¾⟶1-⅞
SW005
SW004
REV 2
MAIN MOTOR
REV3
SW010a
50Hz⟵⟶60Hz
NORMAL CLOSED CONTACT
NORMAL OPEN CONTACT

Fig. 12 REVERSE PLAYBACK MODE

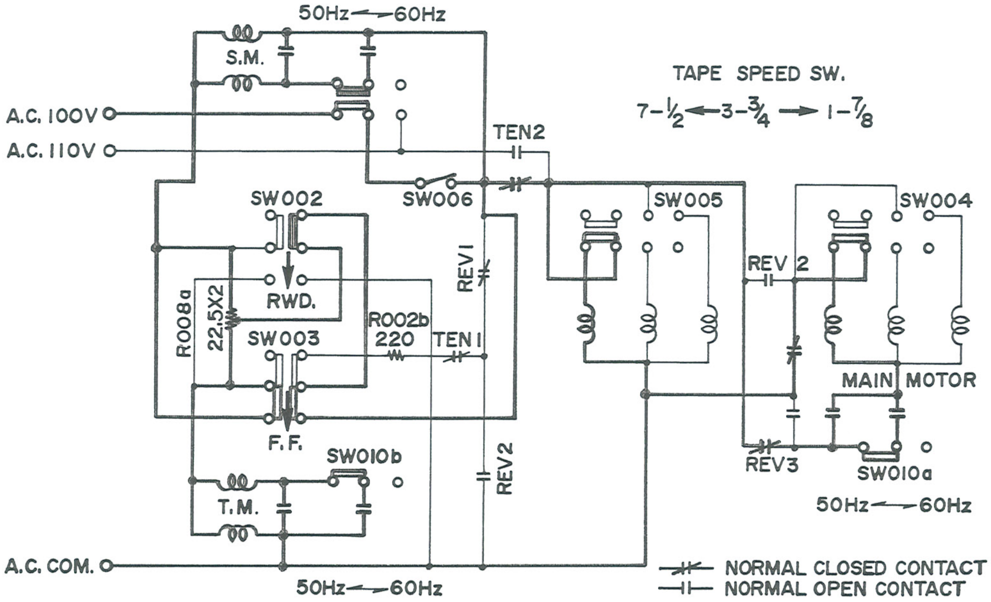

50Hz ⟷ 60Hz
S.M.
A.C. 100V
A.C. 110V
TAPE SPEED SW.
7-1/2 ← 3-3/4 → 1-7/8
TEN2
SW002
SW006
SW005
SW004
REV1
RWD.
R008a
22.5X2
R002b
220
SW003
TEN1
REV 2
MAIN MOTOR
F.F.
SW010b
REV2
REV3
SW010a
50Hz ⟷ 60Hz
T.M.
A.C. COM.
50Hz ⟷ 60Hz
NORMAL CLOSED CONTACT
NORMAL OPEN CONTACT

Fig. 13 F.FWD MODE

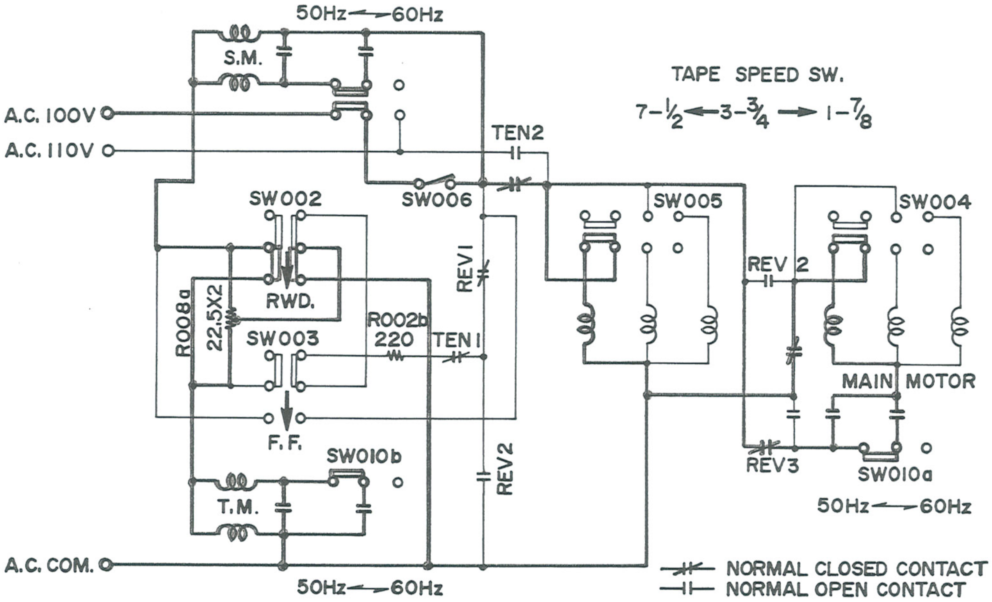
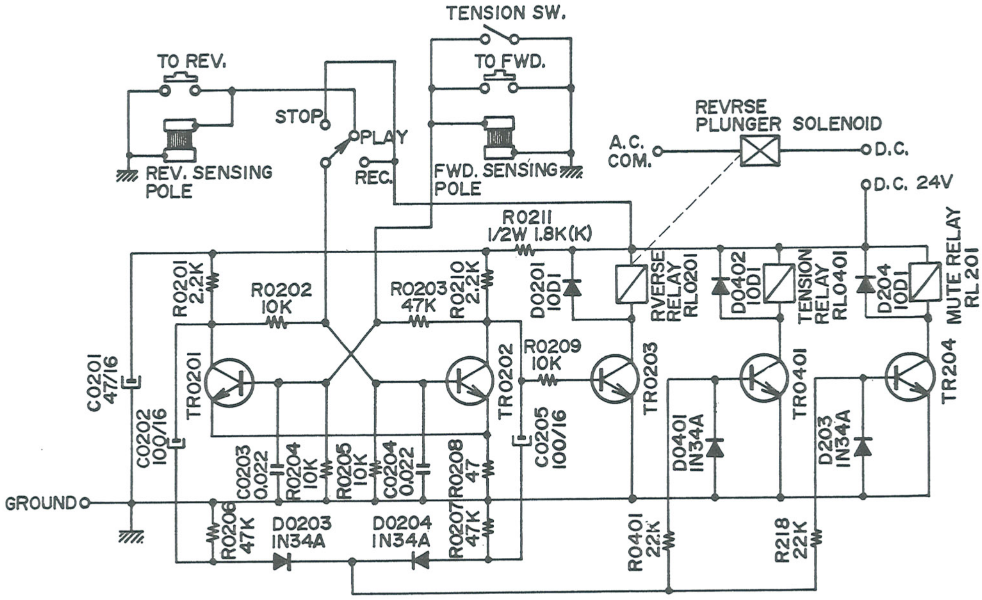

50Hz ⟷ 60Hz
S.M.
A.C. 100V
A.C. 110V
TAPE SPEED SW.
7-1/2 ← 3-3/4 → 1-7/8
TEN2
SW002
SW006
SW005
SW004
REV1
RWD.
R008a
22.5X2
R002b
220
SW003
TEN1
REV 2
MAIN MOTOR
F.F.
SW010b
REV2
REV3
SW010a
50Hz ⟷ 60Hz
T.M.
A.C. COM.
50Hz ⟷ 60Hz
NORMAL CLOSED CONTACT
NORMAL OPEN CONTACT

Fig. 14 RWD MODE


TENSION SW.
TO REV.
TO FWD.
STOP
PLAY
REC.
REV. SENSING POLE
FWD. SENSING POLE
REVRSE PLUNGER SOLENOID
A.C. COM.
D.C.
D.C. 24V
R0211 1/2W 1.8K(K)
R0201 2.2K
R0202 10K
R0203 47K
R0210 2.2K
D0201 10D1
RVERSE RELAY RL0201
D0402 10D1
TENSION RELAY RL0401
D204 10D1
MUTE RELAY RL201
C0201 47/16
TR0201
TR0202
R0209 10K
TR0203
TR0401
TR204
C0202 100/16
C0203 0.022
R0204 10K
R0205 10K
C0204 0.022
R0208 47
C0205 100/16
D0401 IN34A
D203 IN34A
GROUND
R0206 47K
D0203 IN34A
D0204 IN34A
R0207 47K
R0401 22K
R218 22K

Schematic 1

Transistor Mode	TR0201	TR0202	TR0203	TR0401	TR204
Normal P.B.	OFF	ON	OFF	OFF	OFF
Reverse P.B.	ON	OFF	ON	ON	ON

Chart 1

4. SYSTEM CONTROL CIRCUIT OPERATION

1) Tension Relay Operation

The tension relay functions to switch the supply voltage only when the main motor is first started or at reverse time when the starting torque changes until stability is obtained. The tension relay also prevents strong tension from being applied to the tape when tape direction is changed by supplying uniform voltage to both torque motors.

2) Mute Relay Operation

Because tape travel is slow when the machine is first switched to or from Forward and Reverse, the mute relay mutes the line output signal until proper main motor revolutions are reached.

3) System Control Operation

In Schematic 1, at Forward Playback time, because transistor TR0202 base bias is high when compared with transistor TR0201, TR0202 is held at ON condition. Consequently, the collector voltage of TR0202 is low, and transistor TR0203 is OFF. Also because the condenser C0202 is charged by the collector voltage of transistor TR0201, the base bias of transistor TR0401 as well as TR204 is low and is held at OFF condition. When the Reverse Button is depressed, or the sensing tape passes the reverse sensing pole, the base of transistor TR0202 is grounded, the collector voltage of TR0202 increases and TR0203 is turned ON, and because Rev. Relay RL0201 operates, main motor reverse revolutions begin. Also because of the TR0202 collector voltage increase, the charge current which has passed diode D0204 as well as resistors R0401 and R218 and also the internal impedance of transistors TR0401 and TR204 flows to condenser C0205, and while this current is flowing, TR0401 and TR204 is maintained at ON condition, and Tension Relay RL0401 as well as Mute Relay RL201 operates.

When the main motor begins reverse revolutions and proper tape speed is reached, the charge of condenser C0205 will be stopped, TR0401 and TR204 base bias will disappear and these two transistors are turned off, the tension relay as well as the Mute Relay is turned off, and proper reverse mode operation begins. During reverse playback when the FWD Button is depressed or the sensing tape passes the FWD sensing pole, the base of transistor TR0201 is grounded, TR0201 is turned off and the collector voltage increases.

Accordingly, transistor TR0202 base bias becomes high, TR0202 is turned ON and the collector voltage decreases. At this time, TR0203 is turned OFF, and Rev. Relay RL0201 is also turned OFF. Thus, main motor revolutions are switched to normal playback direction. Also because of the TR0201 collector voltage increase, as at reverse time, charge current flows to condenser C0202, and transistor TR0401 and TR204 are turned ON. Consequently, Tension Relay RL0401 as well as Mute Relay RL201 operates. The main motor begins forward revolutions and when proper tape speed is reached, condenser C0202 charge will be stopped, the Tension Relay as well as Mute Relay is turned OFF, and proper forward mode operation begins.

At Stop or Recording mode, voltage is supplied to TR0202 base, and because Reverse Button and sensing tape is irrelevant, main motor revolutions are always in forward playback direction.

V. MECHANISM ADJUSTMENTS

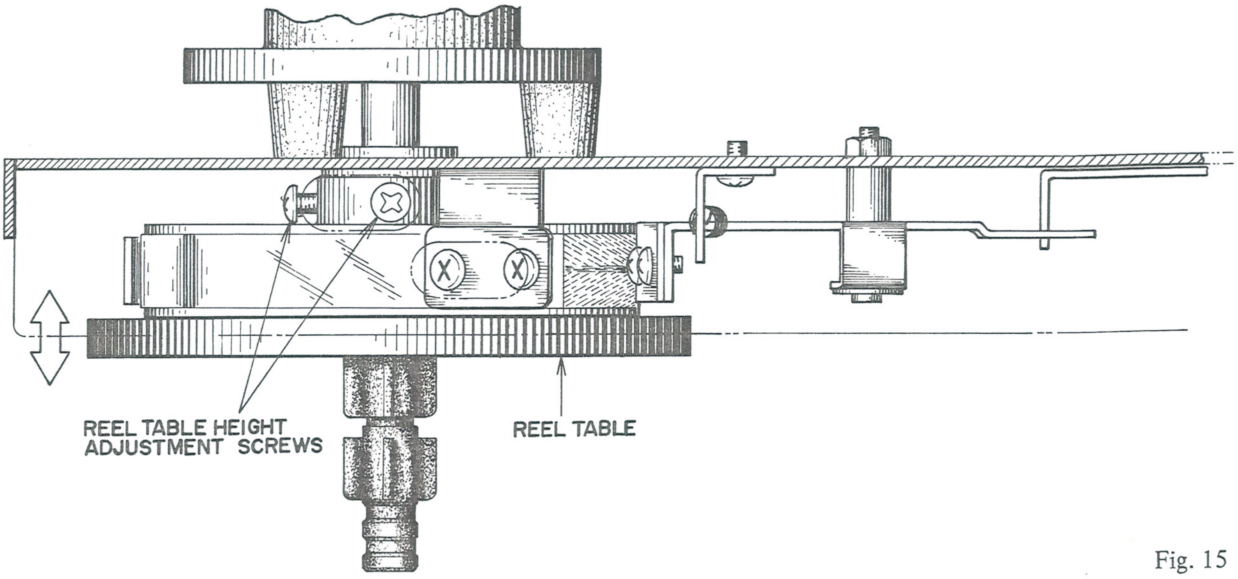

REEL TABLE HEIGHT ADJUSTMENT SCREWS
REEL TABLE

Fig. 15

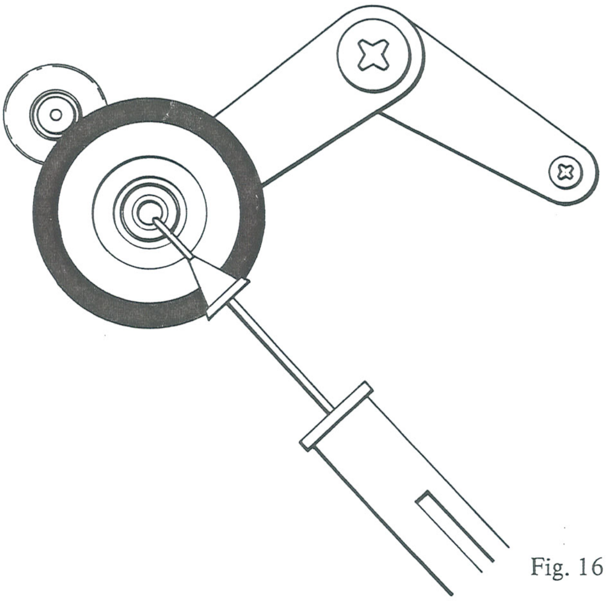


Fig. 16

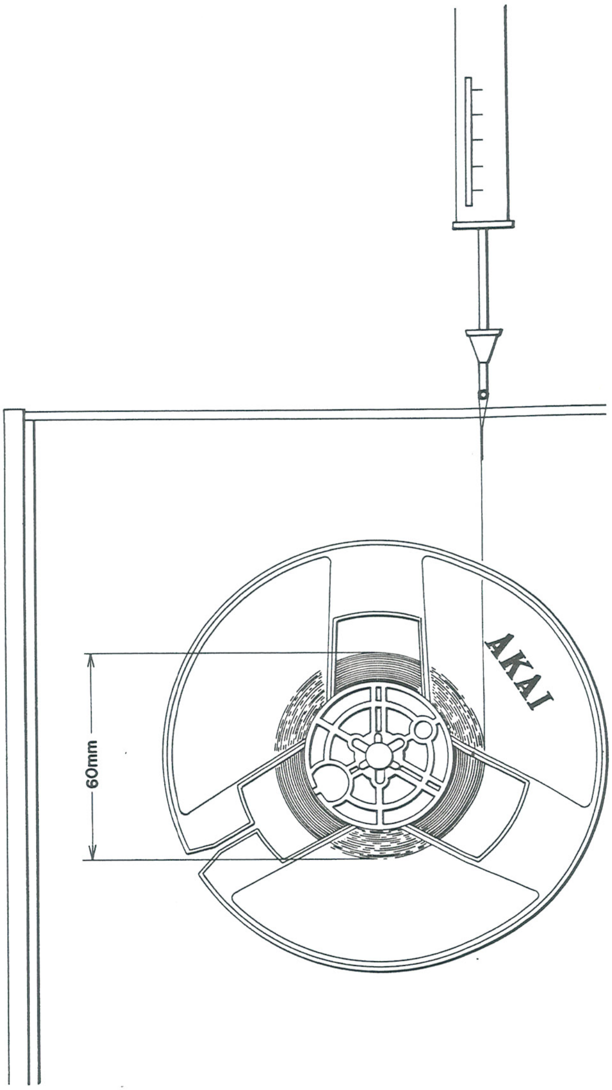


Fig. 17

1. REEL TABLE HEIGHT ADJUSTMENT

As shown in Fig. 15, loosen reel table height adjustment screws, and adjust reel table height by moving table in direction of arrow and positioning so that the tape winds in the center of the reel.

2. PINCH WHEEL PRESSURE MEASURING METHOD

Measure pinch wheel pressure with a tension gauge as shown in Fig. 16. Read the value on the tension gauge as soon as the pinch wheel separates from the tape and tape travel stops. Ideal pinch wheel pressure is 1.8 kg.

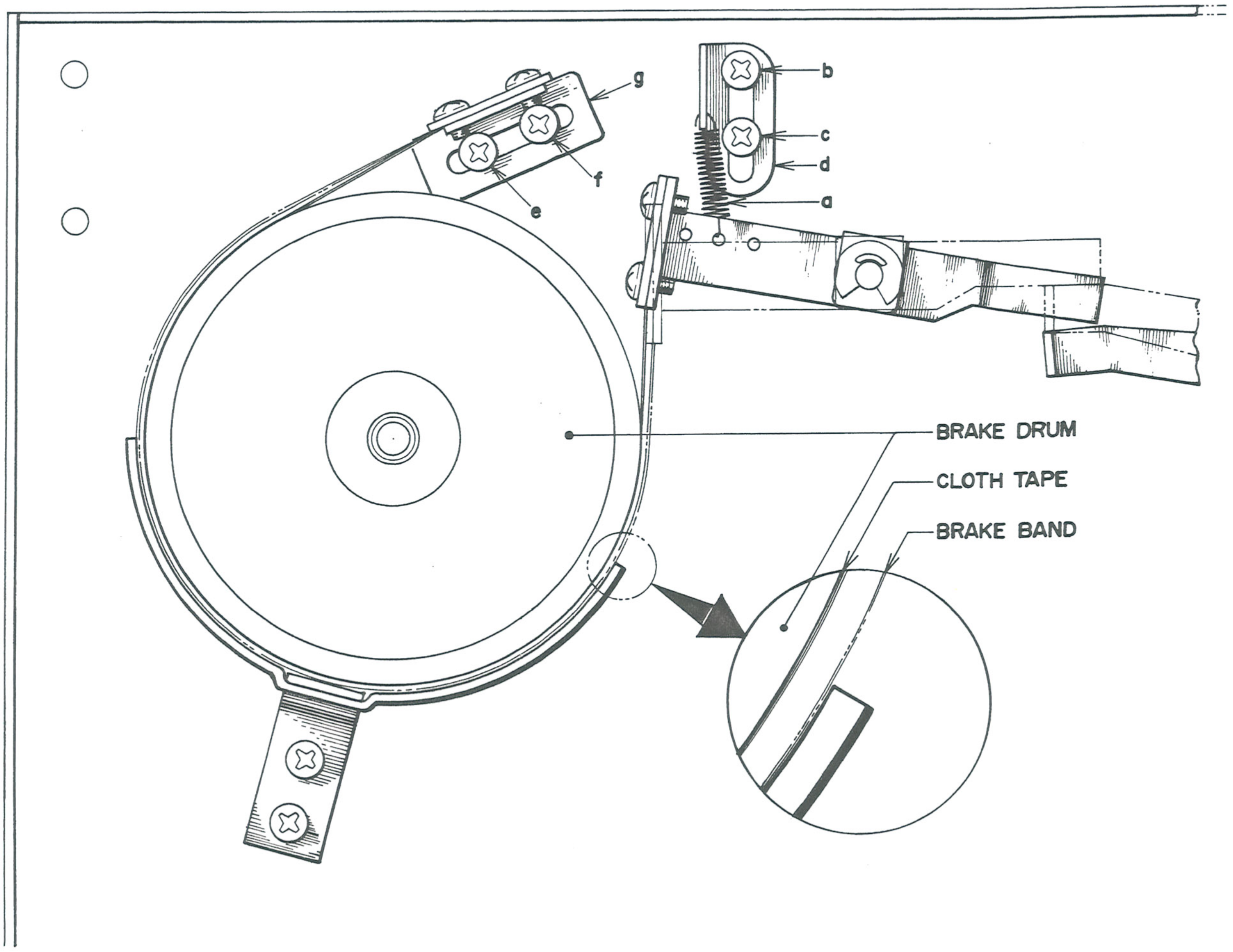


Fig. 18

3. BRAKE TENSION ADJUSTMENT

1) As shown in Fig. 17, use a 60 mm diameter tape wound on a 5″ reel and measure the brake tension with a tension gauge. Ideal brake tension is from 300 to 370 grams.
2) Brake tension adjustment can be made as follows: (Refer to Fig. 18)
   a) Change position of suspended spring (a).
   b) Loosen screws (b) and (c) and adjust the vertical position of spring suspension metal (d).
   c) Loosen screws (e) and (f) and adjust the horizontal position of brake band suspension metal (g).
   d) Only the left side is shown in Fig. 18, but the right side must be adjusted in the same way.

NOTE: In making brake tension adjustment, at all modes except stop mode, confirm that the brake band completely separates from the cloth tape on the brake drum. (Refer to Fig. 18)

4. SUPPLY VOLTAGE AND TENSION AT VARIOUS OPERATING MODES

Torque Motor / Mode	Left Side	Right Side
Normal P.B.	30 V (34 V) 60 g	60 V (68 V) 200 g
Reverse P.B.	60 V (68 V) 200 g	30 V (34 V) 60 g
F.FWD	5.8 V (6 V) 15 g	94.2 V (103 V) 460 to 480 g
RWD	94.2 V (103 V) 460 to 480 g	5.8 V (6 V) 15 g
Tension Relay at Operating Time	45 V (51 V) 100 g	45 V (51 V) 100 g

The voltage shown in parentheses are at 60 Hz.

Chart 2

VI. HEAD ADJUSTMENTS

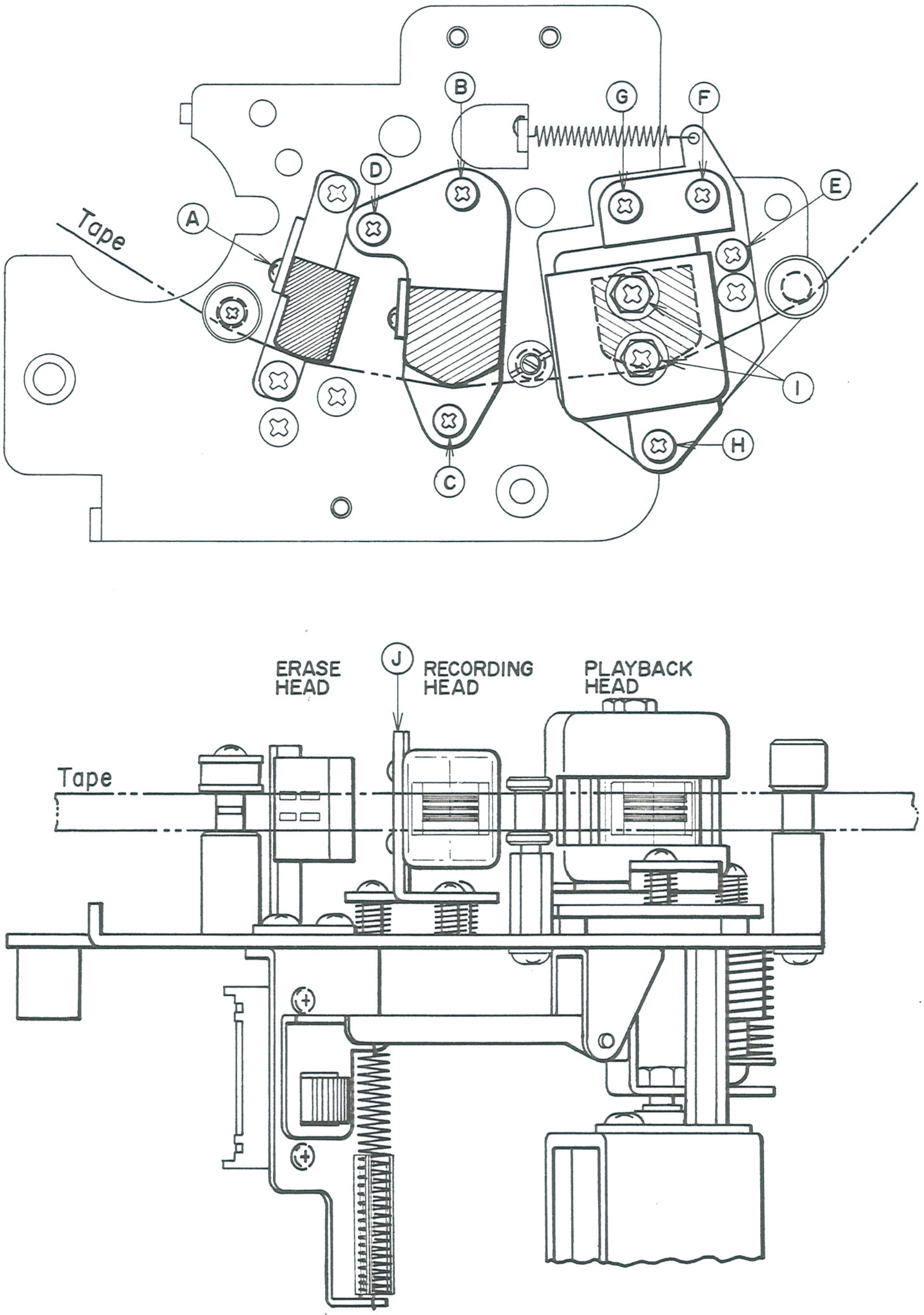


Fig. 19

1. HEAD HEIGHT ADJUSTMENT

1) Erase Head
   At Playback mode, loosen screws (A) shown in Fig. 19 and adjust head height so that the upper edge of the tape is about 0.1 mm lower than the upper edge of the left channel erase head core.
2) Recording Head
   At Playback mode adjust recording head height by turning screws (B) (C) and (D) shown in Fig. 19 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel recording head core.
3) Playback Head
   a) At Forward Playback mode, adjust playback head height by turning screws (F) (G) and (H) shown in Fig. 19 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel playback head core.
   b) At Reverse Playback mode, adjust playback head height by turning screw (E) shown in Fig. 19 to left and right until the lower edge of the tape is the same height as the lower edge of the right channel playback head core.

2. HEAD AZIMUTH ALIGNMENT ADJUSTMENT

1) Playback Head
   a) Connect a high sensitivity V.T.V.M. to the line output terminals.
   b) Set both the Tape Speed Switch and Equalizer Switch to 7-1/2 ips (19 cm/sec), depress STEREO Track Selector, and set the Monitor Switch to TAPE position.
   c) In case of model GX-225D, set Noise Reduction Switch to OFF position.
   d) Playback an 8,000 Hz 3-3/4 ips recorded Ampex Alignment test tape.
   e) At Forward Playback mode, turn Azimuth Alignment Screw (F) shown in Fig. 19 to obtain maximum line output level on both channels.
   f) After the adjustment in Item e) above has been completed, loosen screws (I) shown in Fig. 19 and move the head gap side of the playback head to left and right. When tension is applied to the supply reel side and the line output level of both channels do not fluctuate, (maximum allowable fluctuation within +0.5/–0 dB) fix screws (I) to maintain this condition.
   g) At reverse playback mode, make the same adjustment as outlined above until the line output level of both channels do not fluctuate.

2) Recording Head
   a) Connect an audio frequency oscillator to the line input terminals, and connect a high sensitivity V.T.V.M. to the line output terminals and load a blank tape.
   b) Set both the Tape Speed Switch and Equalizer switch to 7-1/2 ips (19 cm/sec.), depress STEREO Track Selector, and set the monitor switch to TAPE position.
   c) Record a 16,000 Hz audio frequency at –10 dB recording level.
   d) At recording mode, turn Azimuth Alignment Adjustment Screw (D) shown in Fig. 19 to left and right until the line output level of both channels is maximum and does not fluctuate.
   e) After completing adjustment in Item d) above, adjust gap side of recording head by bending installation angle (J) shown in Fig. 19 to left and right until the line output level of both channels do not fluctuate (maximum allowable fluctuation within +0.5/–0 dB) when tension is applied to the supply reel side.

3. To obtain best results, repeat adjustments outlined in paragraphs 1 and 2 above 2 or 3 times.
New blank tape should be used when making these adjustments.

VII. AMPLIFIER ADJUSTMENTS

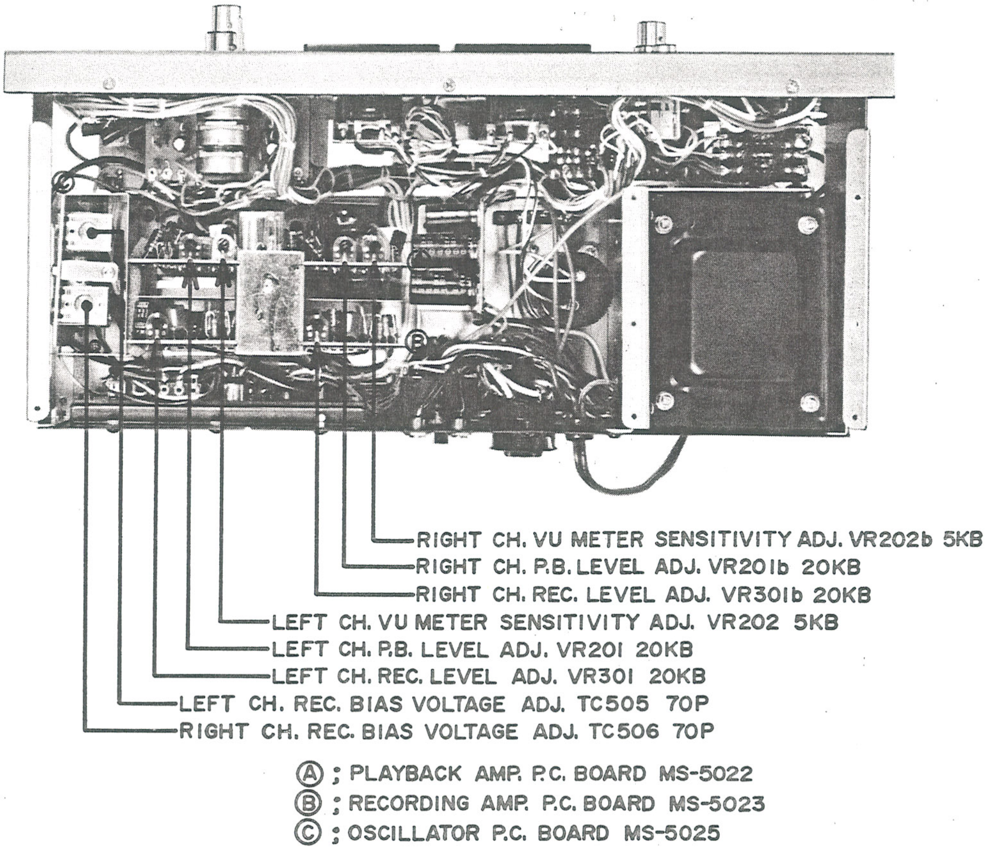

RIGHT CH. VU METER SENSITIVITY ADJ. VR202b 5KB
RIGHT CH. P.B. LEVEL ADJ. VR201b 20KB
RIGHT CH. REC. LEVEL ADJ. VR301b 20KB
LEFT CH. VU METER SENSITIVITY ADJ. VR202 5KB
LEFT CH. P.B. LEVEL ADJ. VR201 20KB
LEFT CH. REC. LEVEL ADJ. VR301 20KB
LEFT CH. REC. BIAS VOLTAGE ADJ. TC505 70P
RIGHT CH. REC. BIAS VOLTAGE ADJ. TC506 70P
Ⓐ ; PLAYBACK AMP. P.C. BOARD MS-5022
Ⓑ ; RECORDING AMP. P.C. BOARD MS-5023
Ⓒ ; OSCILLATOR P.C. BOARD MS-5025
Ⓑ

Fig. 20

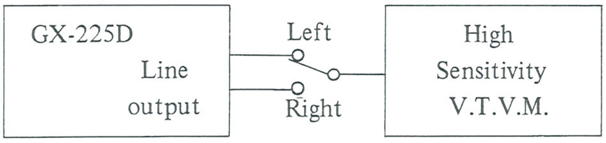

GX-225D
Line
output
Left
Right
High
Sensitivity
V.T.V.M.

Fig. 21

1. PLAYBACK OUTPUT LEVEL ADJUSTMENT

1) Connect a high sensitivity V.T.V.M. to the line output terminals.
2) Set both the Tape Speed Switch and Equalizer Switch to 7-1/2 ips (19 cm/sec.), depress STEREO Track Selector and set the Monitor Switch to TAPE position.
3) In case of model GX-225D, set Noise Reduction Switch to OFF position.
4) Playback a 250 Hz "0" VU pre-recorded test tape.
5) Adjust P.B. Amp. P.C. Board playback level adjustment semi-fixed resistors VR201 20 kB (Left Channel) and VR201b 20 kB (Right Channel) shown in Fig. 20 to obtain a High Sensitivity V.T.V.M. indication of 4 dB (1.228 V)

2. VU METER SENSITIVITY ADJUSTMENT

After the playback output level adjustment has been completed, adjust P.B. Amp. P.C. Board VU meter sensitivity adjustment semi-fixed resistors VR202 5 kB (Left Channel) and VR202b 5 kB (Right Channel) shown in Fig. 20 to obtain a VU meter indication of "0" VU on both channels.

3. HIGH FREQUENCY DEVIATION CHECK

1) Between Channels
When an 8,000 Hz 3-3/4 ips Ampex Alignment test tape is played back, check to confirm that the difference in high range output level between the left and right channel is within 2 dB.
2) Between FWD and REV Playback
Playback and Alignment test tape and check to confirm that the difference in high range level output between FWD and Reverse playback mode is within 3 dB.
3) If Items 1) and 2) above are not within specifications, repeat Head Azimuth Alignment adjustment.

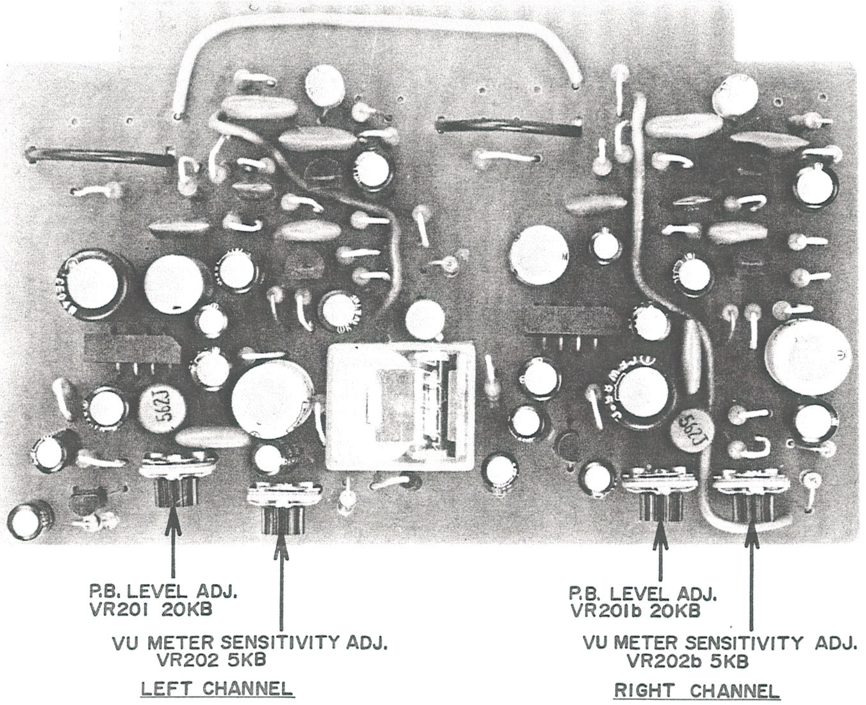
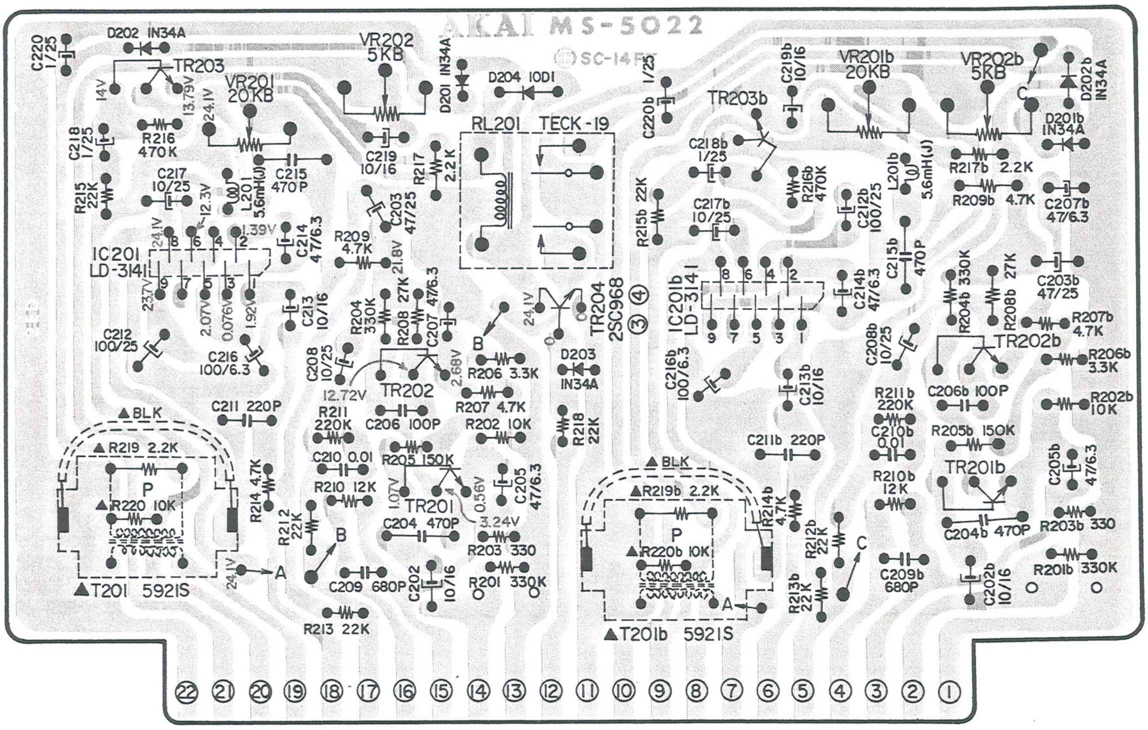

P.B. LEVEL ADJ.
VR201 20KB
VU METER SENSITIVITY ADJ.
VR202 5KB
LEFT CHANNEL
P.B. LEVEL ADJ.
VR201b 20KB
VU METER SENSITIVITY ADJ.
VR202b 5KB
RIGHT CHANNEL

Fig. 22 P.B. AMP. P.C. BOARD (Face Side)


AKAI MS-5022
SC-14F
VR202 5KB
VR201 20KB
TR203
D202 IN34A
D201 IN34A
D204 10D1
RL201 TECK-19
IC201 LD-3141
TR202
TR201
TR204 2SC968
D203 IN34A
T201 5921S
BLK
R219 2.2K
R220 10K
VR201b 20KB
VR202b 5KB
TR203b
D202b IN34A
D201b IN34A
IC201b LD-3141
TR202b
TR201b
R219b 2.2K
R220b 10K
T201b 5921S
22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

MODEL	▲T201	R219	R220	LEAD WIRE (BLK)
GX-221	X	O	X	O
GX-221D	O	X	X	X
GX-225D	X	O	O	X

TR201, 202 ··· 2SC871 Ⓕ
TR203 ·········· 2SC945 Ⓠ Ⓡ

Fig. 23 P.B. AMP. P.C. BOARD MS-5022 (Reverse Side)

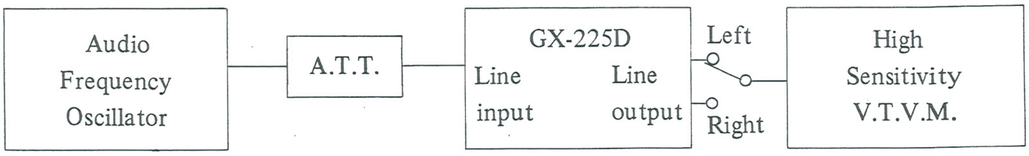

Audio Frequency Oscillator
A.T.T.
GX-225D
Line input
Line output
Left
Right
High Sensitivity V.T.V.M.

Fig. 24

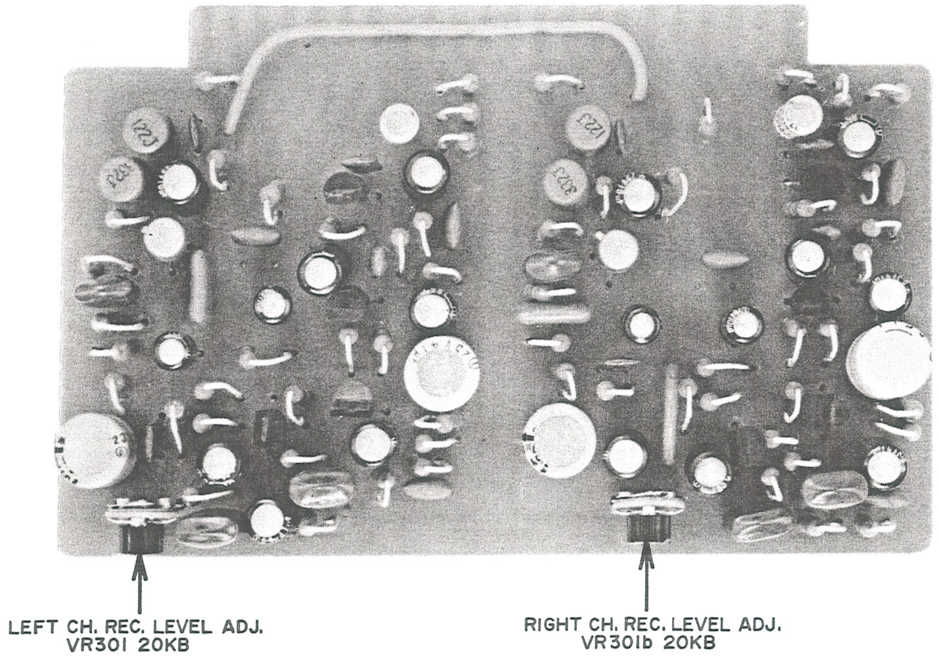

LEFT CH. REC. LEVEL ADJ.
VR301 20KB
RIGHT CH. REC. LEVEL ADJ.
VR301b 20KB

Fig. 25 REC. AMP. P.C. BOARD (Face Side)

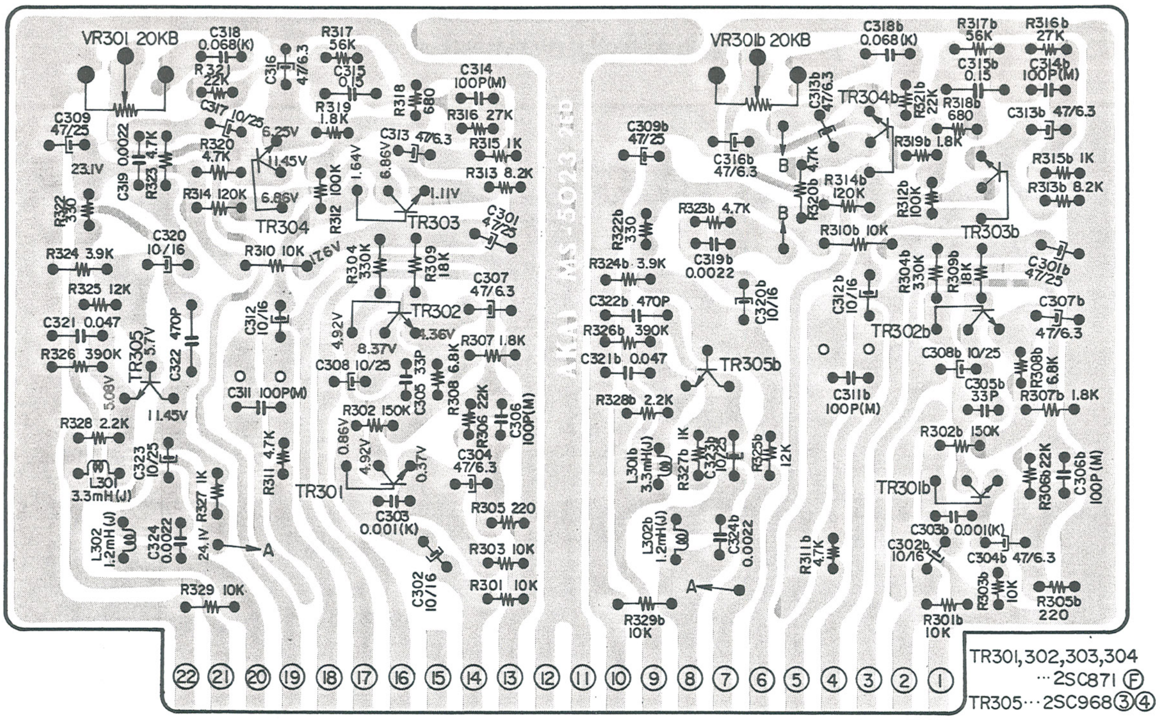

VR301 20KB
C318 0.068(K)
R321 22K
C316 47/6.3
R317 56K
C315 0.15
C314 100P(M)
R318 680
R319 1.8K
R316 27K
C313 47/6.3
R315 1K
R313 8.2K
C309 47/25
C319 0.0022
R323 4.7K
C317 10/25
R320 4.7K
R314 120K
TR304
R312 100K
TR303
C301 47/25
R322 330
R324 3.9K
C320 10/16
R310 10K
R304 330K
R309 18K
C307 47/6.3
R325 12K
C321 0.047
R326 390K
TR305
C322 470P
C312 10/16
TR302
R307 1.8K
C308 10/25
C305 33P
R308 6.8K
C311 100P(M)
R302 150K
R306 22K
C306 100P(M)
R328 2.2K
C323 10/25
L301 3.3mH(J)
R327 1K
R311 4.7K
TR301
C304 47/6.3
C303 0.001(K)
R305 220
L302 1.2mH(J)
C324 0.0022
A
R303 10K
C302 10/16
R301 10K
R329 10K
AKAI MS-5023
VR301b 20KB
C318b 0.068(K)
R317b 56K
R316b 27K
C315b 0.15
C314b 100P(M)
C313b 47/6.3
TR304b
R321b 22K
R318b 680
C309b 47/25
C316b 47/6.3
R319b 1.8K
R315b 1K
R313b 8.2K
R314b 120K
R320b 4.7K
R312b 100K
R322b 330
R323b 4.7K
C319b 0.0022
R310b 10K
TR303b
R324b 3.9K
C320b 10/16
C312b 10/16
R304b 330K
R309b 18K
C301b 47/25
C307b 47/6.3
C322b 470P
R326b 390K
TR302b
C321b 0.047
TR305b
C308b 10/25
R308b 6.8K
C305b 33P
R307b 1.8K
R328b 2.2K
C311b 100P(M)
R302b 150K
L301b 3.3mH(J)
R327b 1K
C323b 10/25
R325b 12K
R306b 22K
C306b 100P(M)
TR301b
L302b 1.2mH(J)
C324b 0.0022
R311b 4.7K
C303b 0.001(K)
C302b 10/16
C304b 47/6.3
R303b 10K
R305b 220
R329b 10K
R301b 10K
B
23.1V
6.25V
1.45V
6.86V
1.64V
1.11V
12.6V
4.92V
8.37V
4.36V
5.7V
5.08V
11.45V
0.86V
0.37V
24.1V
㉒ ㉑ ⑳ ⑲ ⑱ ⑰ ⑯ ⑮ ⑭ ⑬ ⑫ ⑪ ⑩ ⑨ ⑧ ⑦ ⑥ ⑤ ④ ③ ② ①
TR301,302,303,304 ···2SC871 Ⓕ
TR305···2SC968③④

Fig. 26 REC. AMP. P.C. BOARD MS-5023 (Reverse Side)

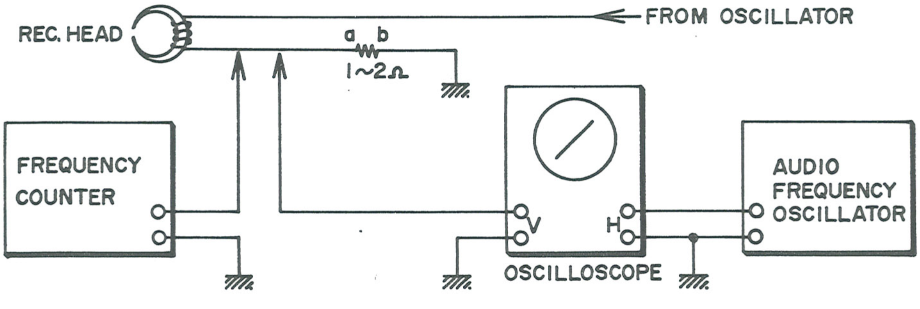

REC. HEAD
FROM OSCILLATOR
a
b
1~2Ω
FREQUENCY COUNTER
V
H
OSCILLOSCOPE
AUDIO FREQUENCY OSCILLATOR

Fig. 27

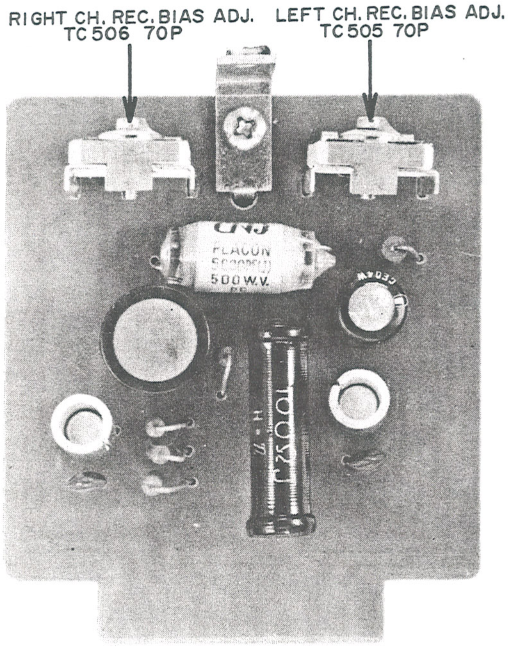

RIGHT CH. REC. BIAS ADJ.
TC506 70P
LEFT CH. REC. BIAS ADJ.
TC505 70P

Fig. 28 OSC. P.C. BOARD (Face Side)

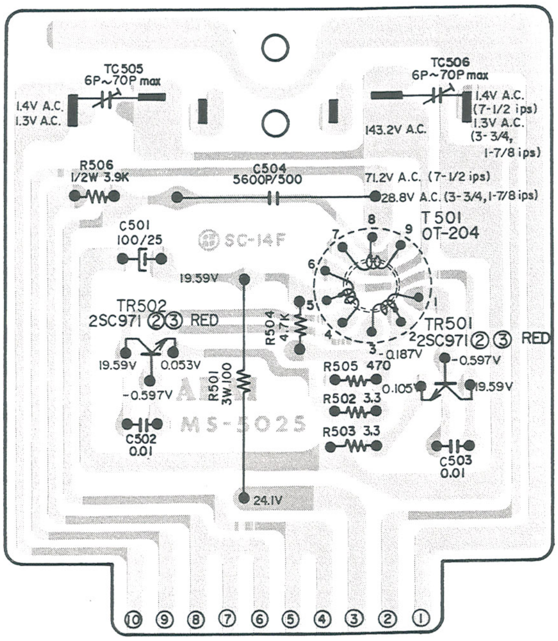

TC505
6P~70P max
1.4V A.C.
1.3V A.C.
TC506
6P~70P max
1.4V A.C.
(7-1/2 ips)
1.3V A.C.
(3-3/4,
1-7/8 ips)
143.2V A.C.
R506
1/2W 3.9K
C504
5600P/500
71.2V A.C. (7-1/2 ips)
28.8V A.C. (3-3/4, 1-7/8 ips)
C501
100/25
SC-14F
T501
OT-204
19.59V
TR502
2SC971 ②③ RED
R504
4.7K
TR501
2SC971 ②③ RED
19.59V
0.053V
-0.597V
-0.187V
-0.597V
R505 470
0.105V
19.59V
R501
3W 100
R502 3.3
R503 3.3
MS-5025
C502
0.01
C503
0.01
24.1V
⑩ ⑨ ⑧ ⑦ ⑥ ⑤ ④ ③ ② ①

Fig. 29 OSC. P.C. BOARD MS-5025 (Reverse Side)

4. RECORDING LEVEL ADJUSTMENT

1) Connect an Audio Frequency Oscillator to the line input terminals through an attenuator, and connect a high sensitivity V.T.V.M. to the line output terminals.
2) Set both the Tape Speed Switch and the Equalizer Switch to 7-1/2 ips (19 cm/sec), depress the STEREO Track Selector, and set the Monitor Switch to TAPE position.
3) In case of model GX-225D, set Noise Reduction Switch to OFF position.
4) Set Recording Level Controls to maximum and load a blank tape (AKAI 100L Tape).
5) Set recorder to recording mode, and supply a 1,000 Hz signal from the Audio Frequency Oscillator. Adjust attenuator to obtain a V.T.V.M. indication of 4 dB.
6) Set Monitor Switch to SOURCE position, and adjust Rec. Amp. P.C. Board recording level adjustment semi-fixed resistors VR301 20 kB (Left Channel), and VR301b 20 kB (Right Channel) shown in Fig. 20 to obtain a V.T.V.M. indication of 4 dB on both channels.

5. RECORDING BIAS FREQUENCY MEASURING METHOD

Method 1

1) As shown in Fig. 27, install a 1 to 2 Ω resistor in series with the recording head and connect the vertical input of an oscilloscope to these terminals (a and b).
2) Supply a sine wave signal from an Audio Frequency Oscillator to the horizontal input of the oscilloscope.
3) Set the recorder to recording mode, and vary the oscillation frequency of the Audio Frequency Oscillator until the waveform of the oscilloscope displays a circular or linear pattern.
4) At the time of a circular or linear pattern display, if the audio frequency oscillator indication is within a range of 100 kHz ±5%, the recording bias frequency is correct.

Method 2

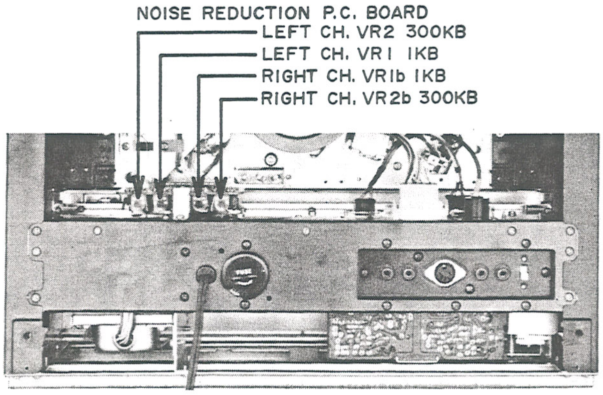
As shown in Fig. 27, connect a frequency counter to terminals a and b, set recorder to recording mode, and take a frequency counter reading.

6. RECORDING BIAS VOLTAGE ADJUSTMENT (Frequency Response Adjustment)

1) Employ the same measuring instruments used in Recording Level Adjustment procedure and connect them in the same way.
2) Foollow Recording Level Adjustment procedure through Item 5), and then set the attenuator to −20 dB.
3) Under these conditions, adjust OSC P.C. Board recording bias voltage adjustment trimmer condensers TC505 70P (Left Channel) and TC506 70P (Right Channel) shown in Fig. 20 to obtain an equally flat response at 1,000 Hz and 10,000 Hz.
4) Recording bias voltage, following frequency response adjustment, is from 1.3 to 1.4 V A.C.
5) Ideal erase voltage is 70 V A.C.

NOTE: The frequency response will vary depending upon the tape being used. As a rule, AKAI 100F Tape (Fuji F tape) is used for this adjustment.

VIII. AUTOMATIC NOISE REDUCTION AMPLIFIER ADJUSTMENTS (Model GX-225D only)


NOISE REDUCTION P.C. BOARD
LEFT CH. VR2 300KB
LEFT CH. VR1 1KB
RIGHT CH. VR1b 1KB
RIGHT CH. VR2b 300KB

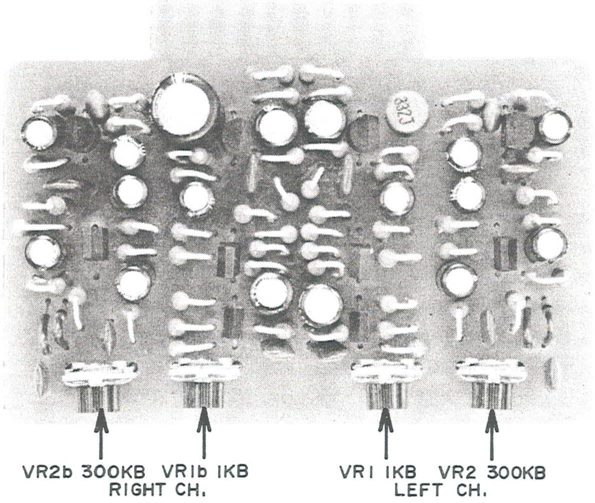

VR2b 300KB
VR1b 1KB
RIGHT CH.
VR1 1KB
VR2 300KB
LEFT CH.

Fig. 31 AUTOMATIC NOISE REDUCTION AMP. P.C. BOARD (Face Side)

1. A.N.R. AMP. ADJUSTMENT

1) Connect the various measuring instruments as shown in Fig. 24.
2) Set recording level adjustment volumes VR1a 50 kA (Left Channel) and VR1b 50 kA (Right Channel) to maximum.
3) Set the Noise Reduction Switch and the S.O.S. Switch to OFF position, and set Monitor Switch to SOURCE.
4) Set tape deck to recording mode, and supply a 100 Hz signal to the line input terminals from the Audio Frequency Oscillator. Adjust attenuator to obtain a high sensitivity V.T.V.M. indication of 4 dB (VU meter indication "0" VU).
5) Adjust Noise Reduction P.C. Board semi-fixed resistors VR2 300 kB (Left Channel) and VR2b 30 kB (Right Channel) shown in Fig. 30 so that when the Noise Reduction Switch is set to ON position, a line output level of 4 dB is maintained.
6) Return Noise Reduction Switch to OFF position and set the oscillation frequency of the Audio Frequency Oscillator to 10 kHz. Then adjust the attenuator to obtain the same results as outlined in Item 4) above.
7) Set Noise Reduction Switch to ON position, and, at this time, adjust Noise Reduction P.C. Board semi-fixed resistors VR1 1 kB (Left Channel) and VR1b 1 kB (Right Channel) shown in Fig. 30 to obtain a line output level decrease of 2.5 dB.
8) After the adjustments in Items 1) through 7) have been completed, decrease the 10 kHz signal by 30 dB and supply this signal to the line input. Confirm that the line output level is 6 ± 0.5 dB lower when the Noise Reduction Switch is at ON position than when at OFF position.

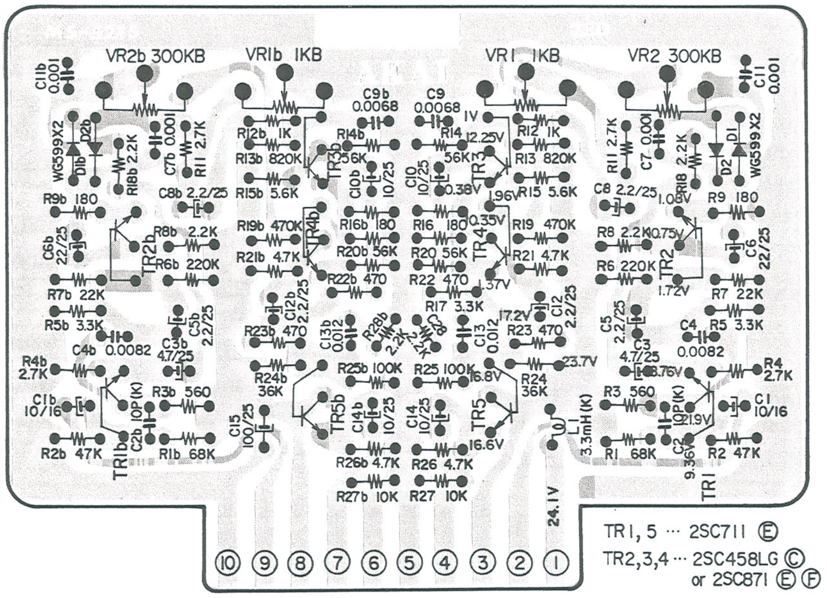

VR2b 300KB
VR1b 1KB
VR1 1KB
VR2 300KB
C11b 0.001
C11 0.001
C9b 0.0068
C9 0.0068
WG599X2
D1b
D2b
D1
D2
R18b 2.2K
C7b 0.001
R11 2.7K
R12b 1K
R14b
R14
R12 1K
R13b 820K
R13 820K
R15b 5.6K
R15 5.6K
C8b 2.2/25
C8 2.2/25
R9b 180
R9 180
TR3b
TR3
TR2b
TR2
TR4b
TR4
R8b 2.2K
R8 2.2K
R6b 220K
R6 220K
C6b 22/25
C6 22/25
R7b 22K
R7 22K
R5b 3.3K
R5 3.3K
C4b 0.0082
C4 0.0082
C3b 47/25
C3 4.7/25
C5b 2.2/25
C5 2.2/25
R4b 2.7K
R4 2.7K
C1b 10/16
C1 10/16
R3b 560
R3 560
R2b 47K
R2 47K
R1b 68K
R1 68K
TR1b
TR1
R19b 470K
R19 470K
R21b 4.7K
R21 4.7K
R16b 180
R16 180
R20b 56K
R20 56K
R22b 470
R22 470
R17 3.3K
R23b 470
R23 470
C12b 2.2/25
C12 2.2/25
C13b 0.012
C13 0.012
R24b 36K
R24 36K
R25b 100K
R25 100K
C15 100/25
TR5b
TR5
C14b 10/25
C14 10/25
C10b 10/25
C10 10/25
R26b 4.7K
R26 4.7K
R27b 10K
R27 10K
L1 3.3mH(K)
1V
12.25V
0.38V
1.96V
0.35V
1.37V
17.2V
1.08V
0.75V
1.72V
23.7V
16.8V
16.6V
8.76V
1.19V
9.36V
24.1V
⑩ ⑨ ⑧ ⑦ ⑥ ⑤ ④ ③ ② ①
TR1, 5 ··· 2SC711 Ⓔ
TR2,3,4 ··· 2SC458LG Ⓒ or 2SC871 Ⓔ Ⓕ

Fig. 32 AUTOMATIC NOISE REDUCTION AMP. P.C. BOARD MS-5215 (Reverse Side)

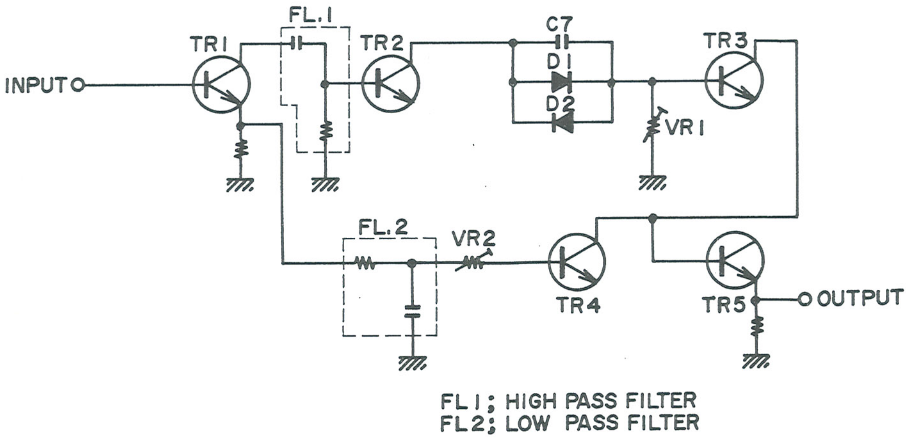


Fig. 33 A.N.R. AMP. BLOCK DIAGRAM

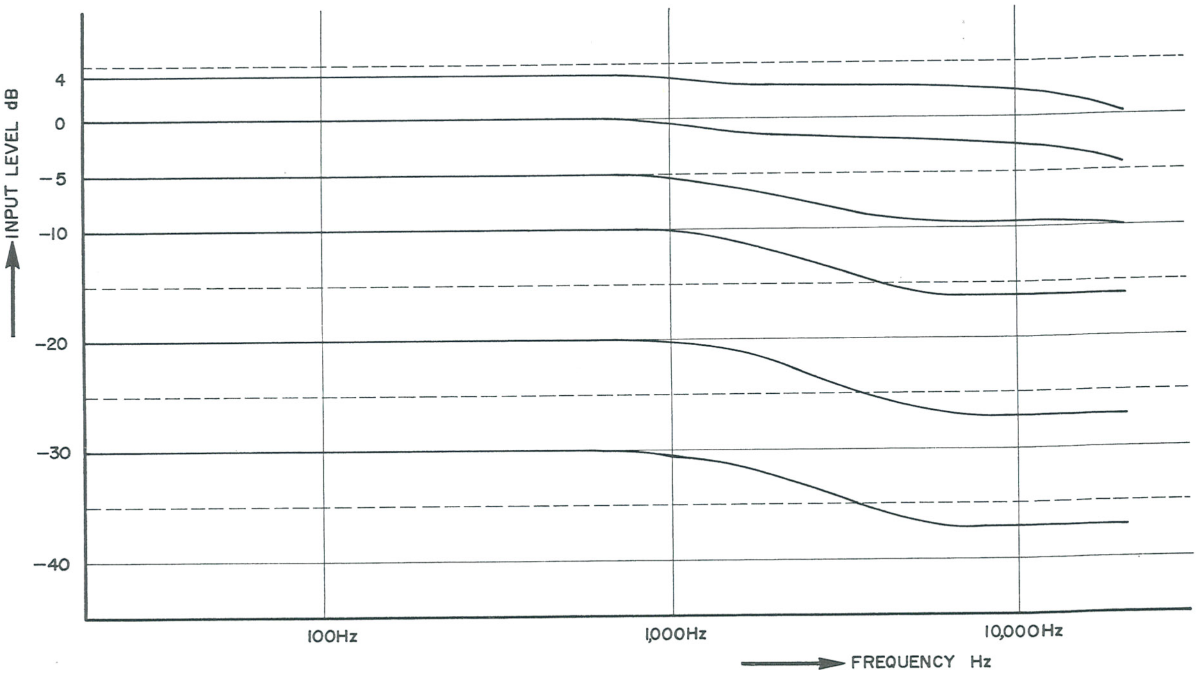


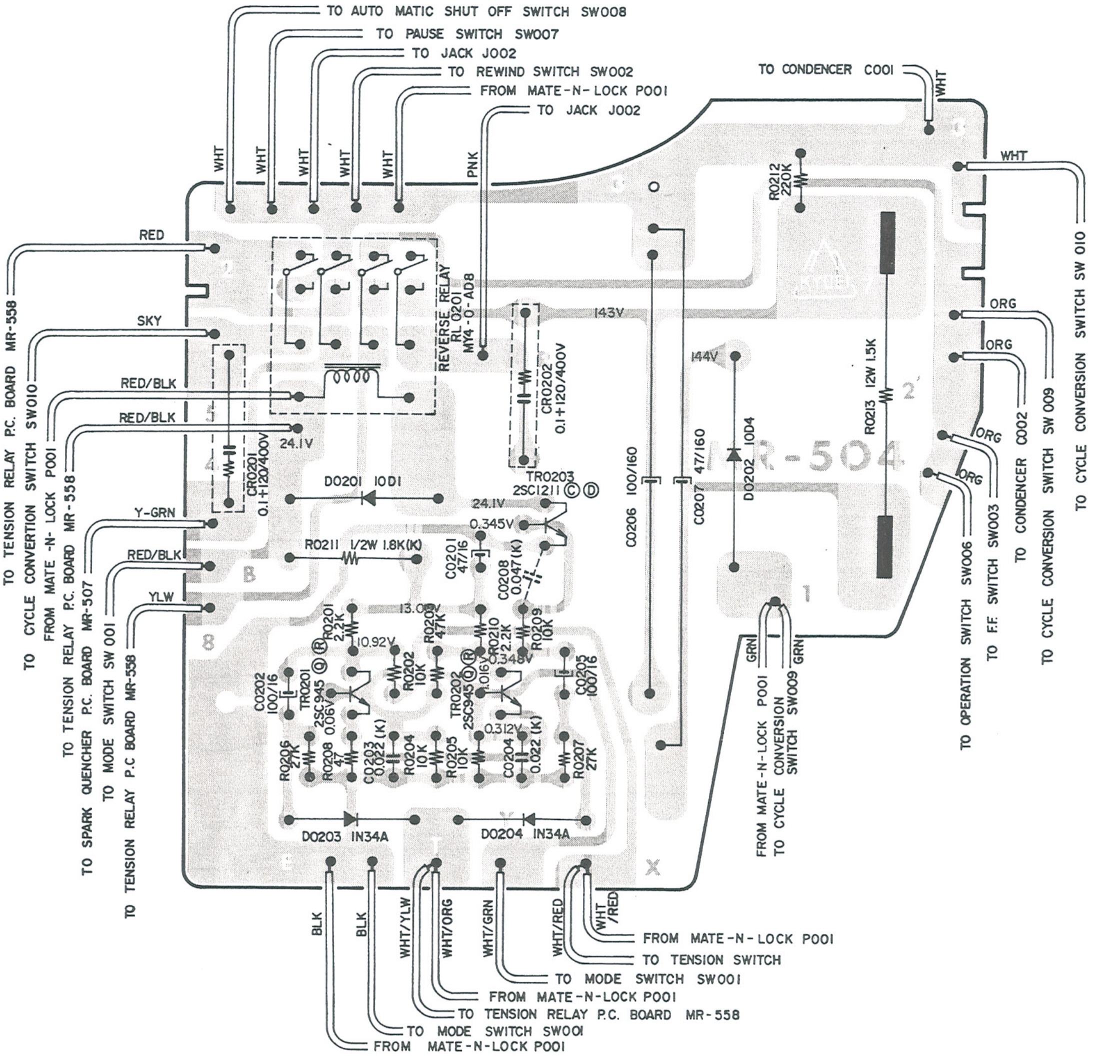
Fig. 34 AUTOMATIC NOISE REDUCTION AMP. CHARACTERISTICS

2. A.N.R. OPERATION AND CHARACTERISTICS (Refer to Fig. 33 & 34)

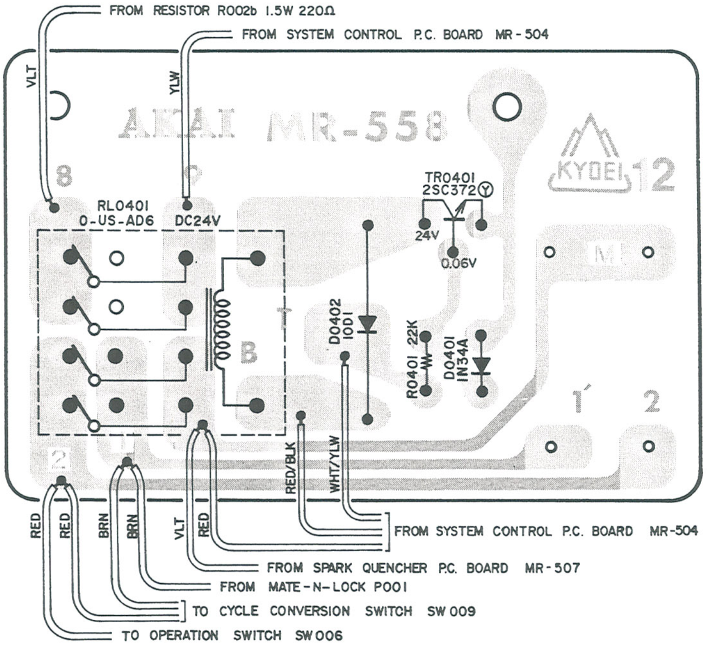
1) The TR1 output signal passes the high pass filter and the low pass filter and is supplied to TR2 and TR4 respectively.
2) The TR2 output passes diodes D1 and D2 as well as condenser C7 and is supplied to TR3. In case the input signal is high, D1 and D2 decreases the impedance and the signal supplied to TR3 is unchanged. Also the signal which passed FL2 is amplified at TR4 and the TR3 and TR4 signals merge at the input side of TR5 and become a composite signal.
3) In case the level of the signal which passed High Pass Filter FL1 is small, diodes D1 and D2 increases the impedance relative to this signal level and the signal supplied to TR3 is even smaller. The signal which passes Low Pass Filter FL2, because there are no variable impedance components such as D1 and D2, is supplied to TR4 unchanged. Consequently, both signals merge, becoming a composite signal and the output becomes a high frequency reduced signal in relation to a low level input.
4) The characteristics of diodes D1 and D2 increases the impedance of low level signals (the lower the level, the more the impedance is increased) so that the signal supplied to TR3 is close to zero. Consequently, the purpose of condenser C7 is to prevent decrease below a certain level.

IX. COMPOSITE VIEWS OF COMPONENTS

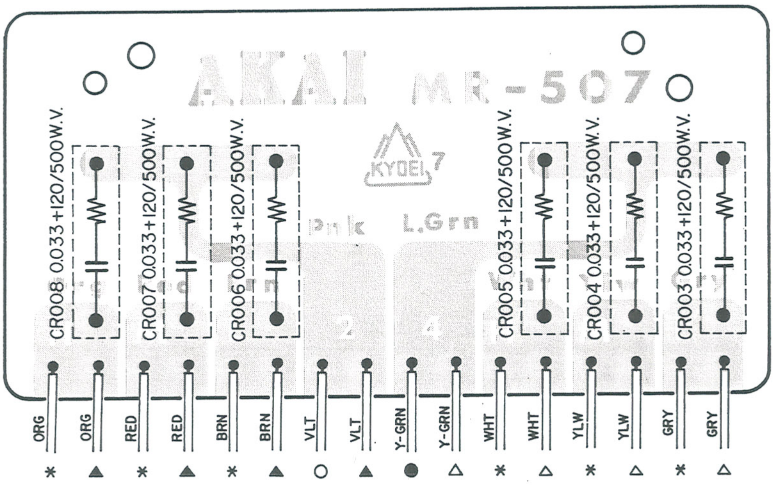
1. SYSTEM CONTROL P.C. BOARD MR-504


TO AUTO MATIC SHUT OFF SWITCH SW008
TO PAUSE SWITCH SW007
TO JACK J002
TO REWIND SWITCH SW002
FROM MATE-N-LOCK P001
TO JACK J002
TO CONDENCER C001
WHT
PNK
RED
SKY
RED/BLK
Y-GRN
YLW
ORG
TO TENSION RELAY P.C. BOARD MR-558
TO CYCLE CONVERTION SWITCH SW010
FROM MATE -N- LOCK P001
TO TENSION RELAY P.C. BOARD MR-558
TO SPARK QUENCHER P.C. BOARD MR-507
TO MODE SWITCH SW 001
TO TENSION RELAY P.C BOARD MR-558
TO CYCLE CONVERSION SWITCH SW 010
TO CYCLE CONVERSION SWITCH SW 009
TO CONDENCER C002
TO F.F. SWITCH SW003
TO OPERATION SWITCH SW006
FROM MATE-N-LOCK P001
TO CYCLE CONVERSION SWITCH SW009
GRN
REVERSE RELAY RL 0201 MY4-O-AD8
CR0201 0.1+120/400V
CR0202 0.1+120/400V
24.1V
143V
144V
D0201 10D1
D0202 10D4
TR0203 2SC1211 ©Ⓓ
0.345V
R0211 1/2W 1.8K(K)
C0201 47/16
C0208 0.047(K)
C0206 100/160
C0207 47/160
R0212 220K
R0213 12W 1.5K
MR-504
13.0V
10.92V
R0201 2.2K
R0203 4.7K
R0210 2.2K
R0209 10K
R0202 10K
0.348V
1.016V
C0202 100/16
TR0201 2SC945 ⓆⓇ
0.06V
TR0202 2SC945ⓆⓇ
C0205 100/16
0.312V
R0206 27K
R0208 47
C0203 0.022 (K)
R0204 10K
R0205 10K
C0204 0.022 (K)
R0207 27K
D0203 IN34A
D0204 IN34A
BLK
WHT/YLW
WHT/ORG
WHT/GRN
WHT/RED
WHT /RED
FROM MATE-N-LOCK P001
TO TENSION SWITCH
TO MODE SWITCH SW001
FROM MATE-N-LOCK P001
TO TENSION RELAY P.C. BOARD MR-558
TO MODE SWITCH SW001
FROM MATE-N-LOCK P001

2. TENSION RELAY P.C. BOARD MR-558


FROM RESISTOR R002b 1.5W 220Ω
FROM SYSTEM CONTROL P.C. BOARD MR-504
VLT
YLW
AKAI MR-558
KYOEI 12
RL0401 0-US-AD6 DC24V
TR0401 2SC372Ⓨ
24V
0.06V
D0402 10D1
R0401 22K
D0401 IN34A
RED/BLK
WHT/YLW
FROM SYSTEM CONTROL P.C. BOARD MR-504
RED
BRN
VLT
RED
FROM SPARK QUENCHER P.C. BOARD MR-507
FROM MATE-N-LOCK P001
TO CYCLE CONVERSION SWITCH SW 009
TO OPERATION SWITCH SW006

3. SPARK QUENCHER P.C. BOARD MR-507


AKAI MR-507
KYOEI 7
CR008 0.033+120/500W.V.
CR007 0.033+120/500W.V.
CR006 0.033+120/500W.V.
CR005 0.033+120/500W.V.
CR004 0.033+120/500W.V.
CR003 0.033+120/500W.V.
Pnk
L.Grn
2
4
ORG
ORG
RED
RED
BRN
BRN
VLT
VLT
Y-GRN
Y-GRN
WHT
WHT
YLW
YLW
GRY
GRY
✱ ▲ ✱ ▲ ✱ ▲ ○ ▲ ● △ ✱ △ ✱ △ ✱ △

NOTE

✱ ; TO CAPSTAN MOTOR TYPE HC-16X

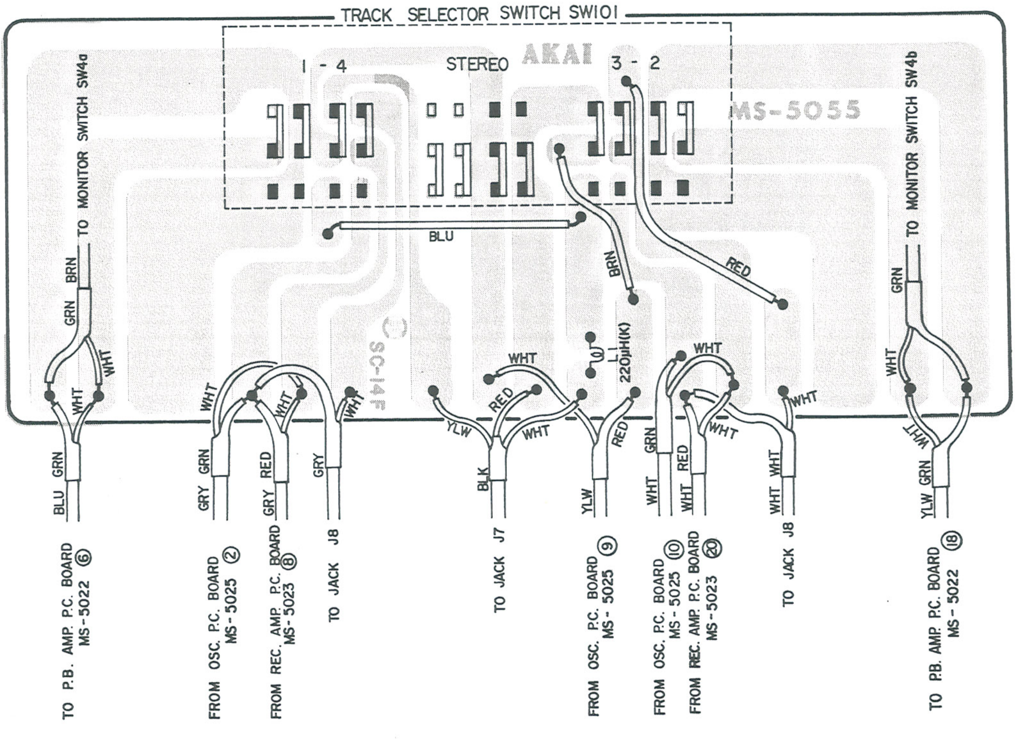
▲ ; FROM TAPE SPEED SWITCH SW 005

△ ; FROM TAPE SPEED SWITCH SW 004

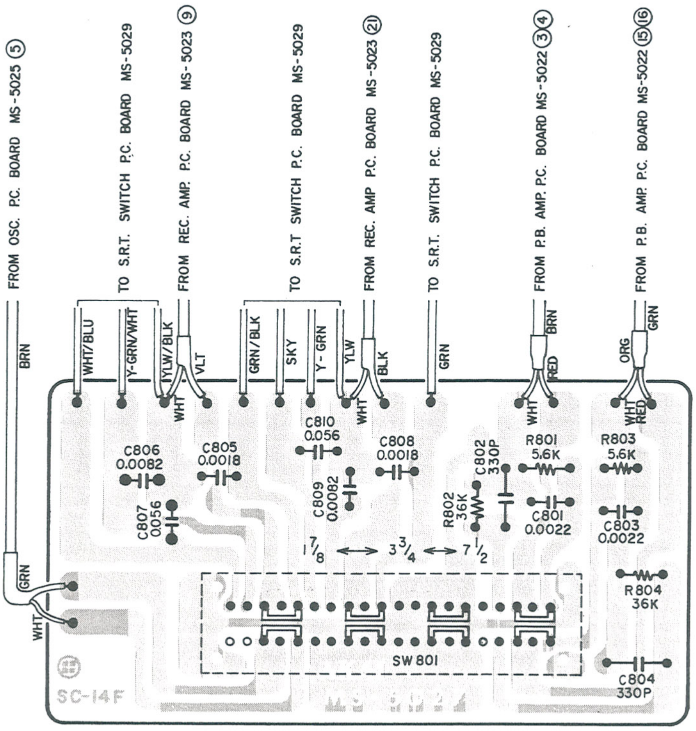
○ ; FROM TENSION RELAY P.C. BOARD MR-558

● ; FROM SYSTEM CONTROL P.C. BOARD MR-504

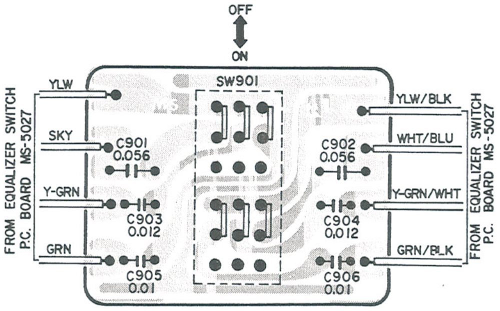
4. TRACK SELECTOR P.C. BOARD MS-5055


TRACK SELECTOR SWITCH SW101
AKAI
MS-5055
1 - 4
STEREO
3 - 2
TO MONITOR SWITCH SW4a
TO MONITOR SWITCH SW4b
BLU
BRN
RED
L1 220μH(K)
SC-14F
GRN
BRN
WHT
WHT
BLU GRN
WHT
WHT
GRY GRN
GRY RED
GRY
WHT
YLW
RED
WHT
BLK
YLW
RED
WHT
GRN
WHT
WHT RED
WHT
WHT WHT
GRN
WHT
WHT
YLW GRN
TO P.B. AMP. P.C. BOARD MS-5022 ⑥
FROM OSC. P.C. BOARD MS-5025 ②
FROM REC. AMP. P.C. BOARD MS-5023 ⑧
TO JACK J8
TO JACK J7
FROM OSC. P.C. BOARD MS-5025 ⑨
FROM OSC. P.C. BOARD MS-5025 ⑩
FROM REC. AMP. P.C. BOARD MS-5023 ⑳
TO JACK J8
TO P.B. AMP. P.C. BOARD MS-5022 ⑱

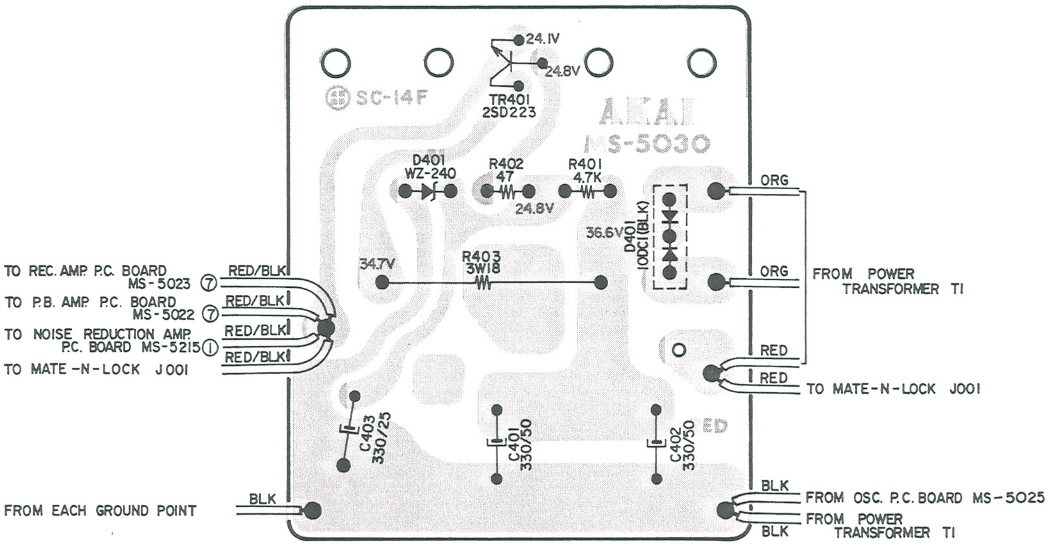
5. EQUALIZER SWITCH P.C. BOARD MS-5027


FROM OSC. P.C. BOARD MS-5025 ⑤
TO S.R.T. SWITCH P.C. BOARD MS-5029
FROM REC. AMP. P.C. BOARD MS-5023 ⑨
TO S.R.T. SWITCH P.C. BOARD MS-5029
FROM REC. AMP. P.C. BOARD MS-5023 ②
TO S.R.T. SWITCH P.C. BOARD MS-5029
FROM P.B. AMP. P.C. BOARD MS-5022 ③④
FROM P.B. AMP. P.C. BOARD MS-5022 ⑮⑯
BRN
WHT/BLU
Y-GRN/WHT
YLW/BLK
VLT
WHT
GRN/BLK
SKY
Y-GRN
YLW
BLK
WHT
GRN
BRN
RED
WHT
ORG
GRN
WHT
RED
C806
0.0082
C805
0.0018
C807
0.056
C810
0.056
C809
0.0082
C808
0.0018
C802
330P
R802
36K
R801
5.6K
C801
0.0022
R803
5.6K
C803
0.0022
1 7/8 ⟷ 3 3/4 ⟷ 7 1/2
R804
36K
SW 801
C804
330P
GRN
WHT
SC-14F
MS-5027

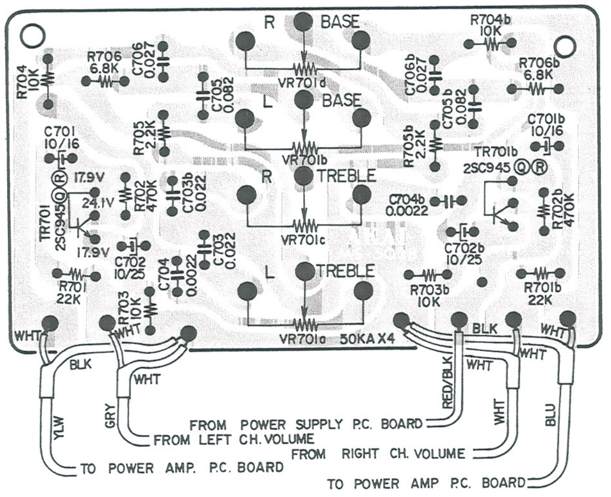
6. S.R.T. SWITCH P.C. BOARD MS-5029


OFF
ON
SW901
YLW
SKY
Y-GRN
GRN
FROM EQUALIZER SWITCH P.C. BOARD MS-5027
C901
0.056
C903
0.012
C905
0.01
C902
0.056
C904
0.012
C906
0.01
YLW/BLK
WHT/BLU
Y-GRN/WHT
GRN/BLK
FROM EQUALIZER SWITCH P.C. BOARD MS-5027

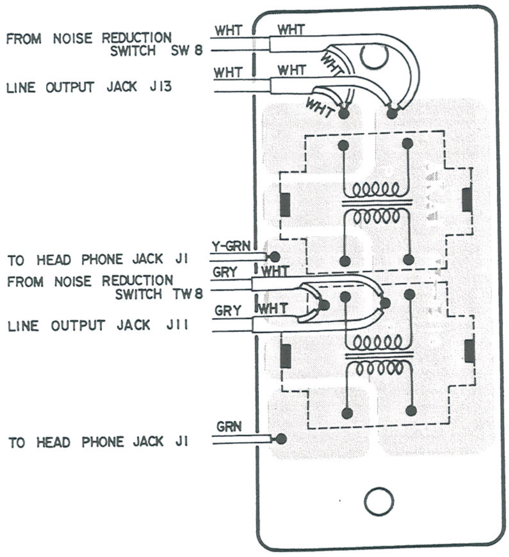
7. POWER SUPPLY P.C. BOARD MS-5030


24.1V
24.8V
TR401
2SD223
SC-14F
AKAI
MS-5030
D401
WZ-240
R402
47
R401
4.7K
24.8V
36.6V
D401
10DC1(BLK)
ORG
ORG
FROM POWER TRANSFORMER T1
34.7V
R403
3W18
TO REC. AMP. P.C. BOARD MS-5023 ⑦
TO P.B. AMP. P.C. BOARD MS-5022 ⑦
TO NOISE REDUCTION AMP. P.C. BOARD MS-5215①
TO MATE-N-LOCK J001
RED/BLK
RED/BLK
RED/BLK
RED/BLK
RED
RED
TO MATE-N-LOCK J001
C403
330/25
C401
330/50
C402
330/50
ED
FROM EACH GROUND POINT
BLK
BLK
FROM OSC. P.C. BOARD MS-5025
BLK
FROM POWER TRANSFORMER T1

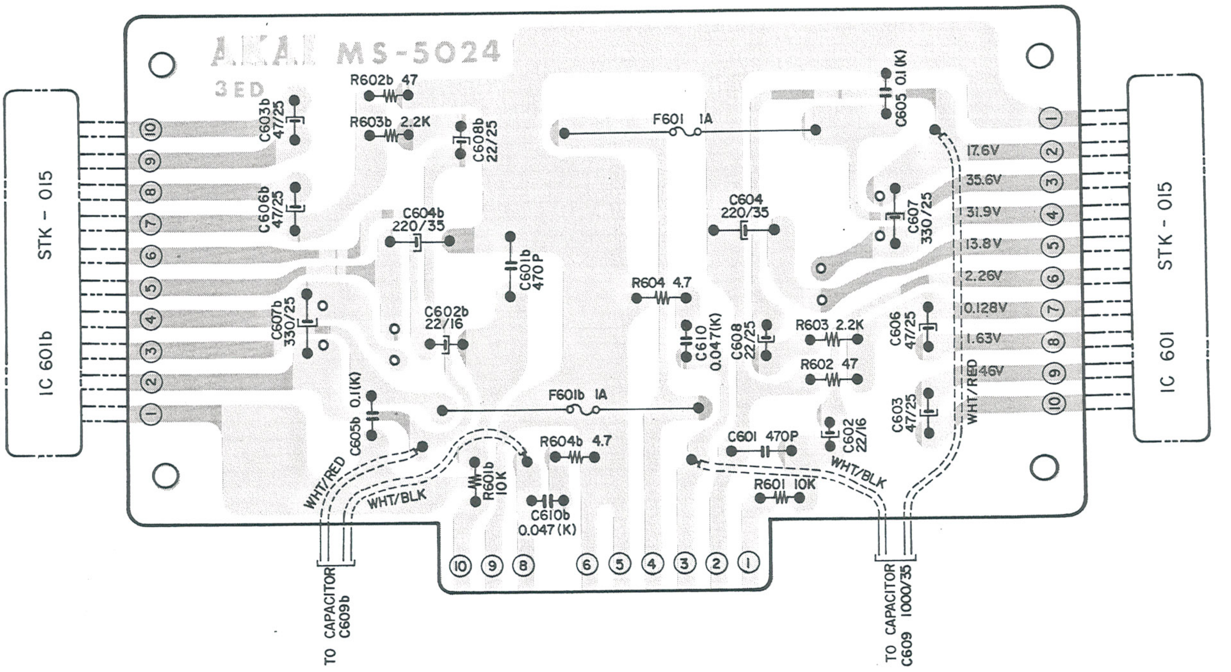
8. TONE CONTROL P.C. BOARD MS-5028


R
BASE
L
BASE
R
TREBLE
L
TREBLE
VR701d
VR701b
VR701c
VR701a 50KA X4
R704 10K
R706 6.8K
C706 0.027
C705 0.082
C701 10/16
R705 2.2K
17.9V
24.1V
R702 470K
C703b 0.022
TR701 2SC945 Q R
17.9V
C702 10/25
C704 0.0022
C703 0.022
R701 22K
R703 10K
R704b 10K
R706b 6.8K
C706b 0.027
C705b 0.082
C701b 10/16
R705b 2.2K
TR701b 2SC945 Q R
C704b 0.0022
R702b 470K
C702b 10/25
R703b 10K
R701b 22K
WHT
BLK
WHT
WHT
BLK
WHT
WHT
RED/BLK
WHT
YLW
GRY
WHT
BLU
FROM POWER SUPPLY P.C. BOARD
FROM LEFT CH. VOLUME
FROM RIGHT CH. VOLUME
TO POWER AMP. P.C. BOARD
TO POWER AMP P.C. BOARD

9. HEAD PHONE TRANS. P.C. BOARD MS-5216


FROM NOISE REDUCTION SWITCH SW 8
LINE OUTPUT JACK J13
WHT
WHT
WHT
WHT
WHT
WHT
TO HEAD PHONE JACK J1
FROM NOISE REDUCTION SWITCH TW 8
LINE OUTPUT JACK J11
Y-GRN
GRY
WHT
GRY
WHT
TO HEAD PHONE JACK J1
GRN

10. POWER AMP. P.C. BOARD MS-5024


AKAI MS-5024
3ED
IC 601b
STK - 015
IC 601
STK - 015
R602b 47
R603b 2.2K
C603b 47/25
C608b 22/25
C606b 47/25
C604b 220/35
C601b 470P
C607b 330/25
C602b 22/16
C605b 0.1(K)
F601b 1A
R604b 4.7
R601b 10K
C610b 0.047(K)
F601 1A
C605 0.1(K)
C604 220/35
C607 330/25
R604 4.7
C610 0.047(K)
C608 22/25
R603 2.2K
R602 47
C606 47/25
C603 47/25
C601 470P
C602 22/16
R601 10K
17.6V
35.6V
31.9V
13.8V
2.26V
0.128V
1.63V
1.46V
WHT/RED
WHT/BLK
WHT/RED
WHT/BLK
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩
⑩ ⑨ ⑧ ⑥ ⑤ ④ ③ ② ①
TO CAPACITOR C609b
TO CAPACITOR C609 1000/35

SECTION 2

PARTS LIST

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FIG. 19 AMPLIFIER ASSEMBLY BLOCK 53
FIG. 20 FINAL ASSEMBLY BLOCK 55
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HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read List

The reference number corresponds with illustration or photo number of that particular parts list.

This number corresponds with the Figure Number.

This number corresponds with the individual parts index number in that figure.

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

12-115x

Schematic Diagram Number of individual manufactured part. (not required for parts order)

Quantity of particular part required.

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		FLYWHEEL BLOCK #13		
12-115x	800425	Flywheel Block Assy. Comp.	RDG# 13	1
12-116	244506	Flywheel Only	RD-233	1
12-117x	244754	Felt, Flywheel	RD-275	1
12-118	251324	Main Metal Case	RD-236	1
12-119	253080	Main Metel	RD-237	1

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of Components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.

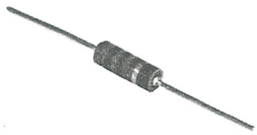
   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

ELECTRICAL PARTS TABLE

ELECTRICAL PARTS LIST TABLE

Because the indication of resistors and capacitors in the P.C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table..

1



Solid Resistor

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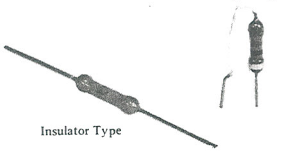

Carbon Resistor

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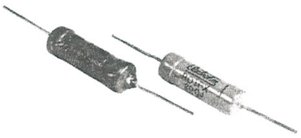

Metal Oxide Film Resistor

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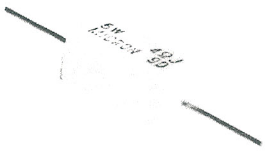

Cement Resistor

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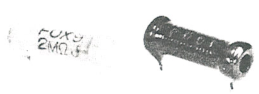

Wire-Wound Resistor

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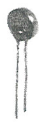

Thermistor

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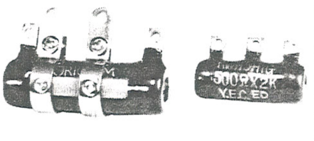

Enamel Resistor

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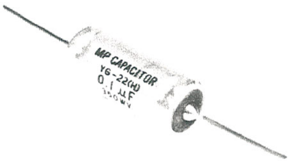
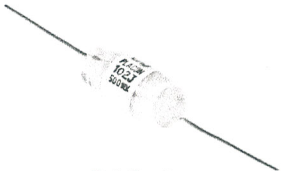


MP Capacitor (Tubler Type)

2



Plastic Capacitor

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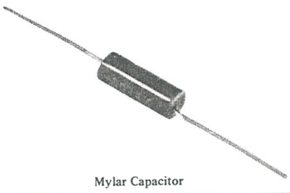

Mylar Capacitor

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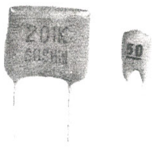

VFM (Hi-Q) Capacitor

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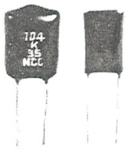

Mylar Capacitor

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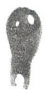

Tantalum Capacitor

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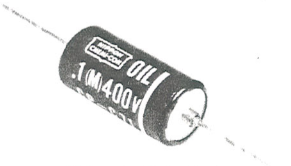

Oil Capacitor (Tubler Type)

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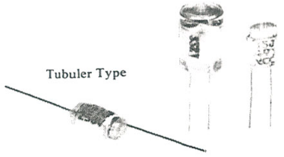

Styrol Capacitor

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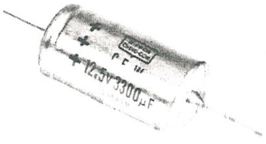

Electrolytic Capacitor (Tubler Type)

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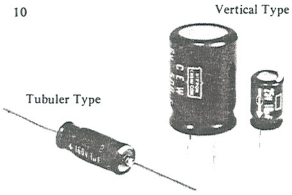

Electrolytic Capacitor

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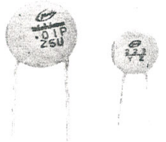

Ceramic Capacitor

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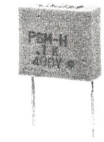

Metalized Mylar (Paper Capacitor)

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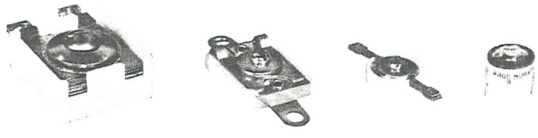
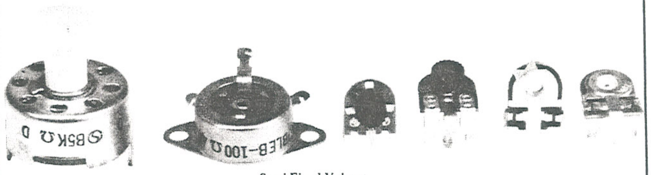


Trimmer Condenser

VR



Semi-Fixed Volume

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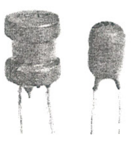
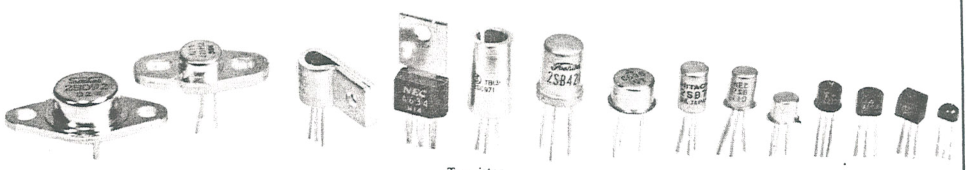


Ferri Inductor

TR



Transistor

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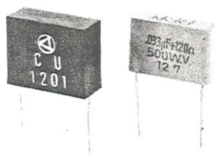

Spark Quencher

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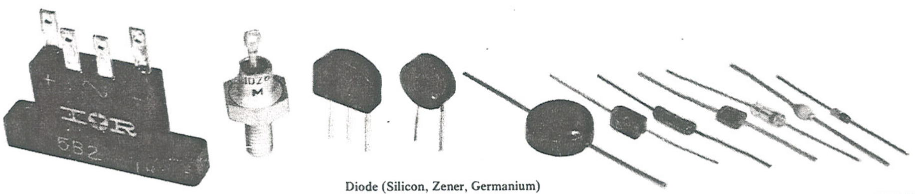
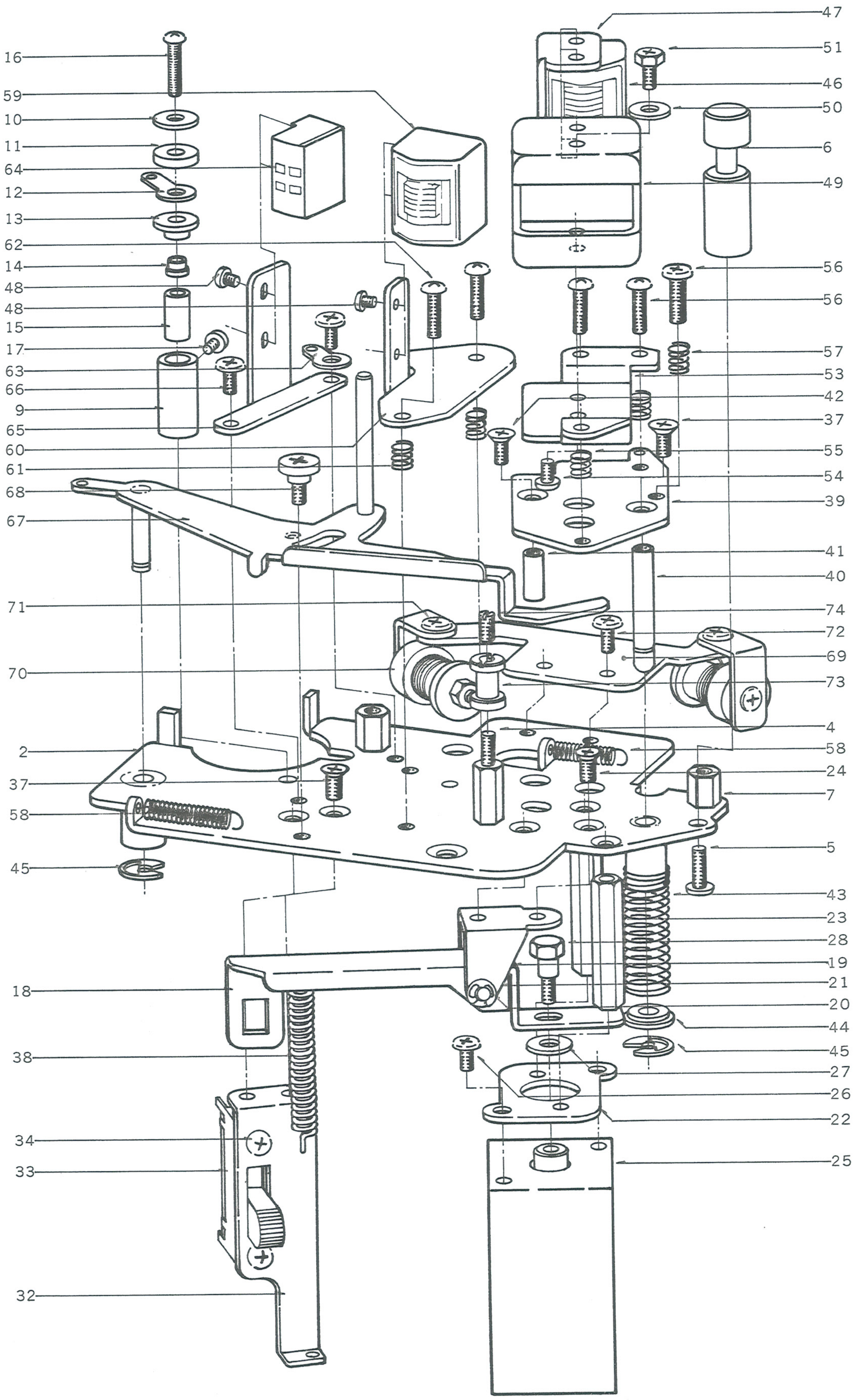


Diode (Silicon, Zener, Germanium)

FIG. 1 ILLUSTRATION OF MS HEAD BLOCK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MS HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
1-1x	BH426047	MS Head Block Comp.		1
1-2	HZ425417	Head Base Plate, w/metal	MS-0001	1
1-3x	MZ303298	T Arm Cushion (Rubber)	RD-281	2
1-4	HZ425542	Tape Guide Prop B	MS-0003	1
1-5	ZW417025	Screw, binding head 3x8, w/washer		3
1-6	HZ425597	Tape Guide Prop C	MS-0011	1
1-7	HZ425586	Head Cover Post	MS-0004	1
1-8x	ZW413188	Nut, M4		2
1-9	HZ425430	Tape Guide Prop A	MS-0015	1
1-10	ZW396786	Tape Guide Washer	KD-0035	1
1-11	HZ396505	Insulator Collar	KD-0007	1
1-12	ZW273778	Earth Lug, M3		1
1-13	HZ396595	Sensing Guide D	KD-0016	1
1-14	HZ317632	Insulator Collar A	MR-36	1
1-15	HZ396797	Sensing Guide	KD-0036	1
1-16	ZW202252	Screw, round head 2.3x12		1
1-17	ZW432674	Screw, pan head 3x3		1
1-18	HL317676	Plunger Lever	MR-16	1
1-19	HZ317687	Lever Support	MR-15	1
1-20	ZW257477	Connecting Pin	RD-211	1
1-21	ZW270088	'E' Ring 1.9M	6-1-9	1
1-22	HZ317698	Plunger Base	RD-21	1
1-23	HZ317700	Plunger Retaining Prop	MR-6	2
1-24	ZW432685	Screw, countersunk head 3x6		2
1-25	EP318115	Plunger Solenoid RGA10143	44-1-25	1
1-26	ZW413223	Screw, binding head 3x5, w/washer		2
1-27	ZW450753	Washer (Nylon) D4.1x9x1t		1
1-28	ZW317711	Plunger Bolt	MR-17	1
1-29x	EJ299788	6P Plug	42-1-21	1
1-30x	EJ425632	4P Plug, Consent S-I5908	42-1-23	1
1-31x	MZ314403	Nylon Clip HP-2N		3
1-32	HZ317733	Slide Switch Base	MR-18	1
1-33	ES317744	Slide Switch SL-242B4V	25-3-28	1
1-34	ZW432696	Screw, round head 2.6x5		2
1-35x	ZW317801	Toothed Lock Washer, M2.6		2
1-36x	EJ308981	Mold 4P Plug	42-1-22	1
1-37	ZW200417	Screw, countersunk head 3x6		3
1-38	ZG317766	Plunger Lever Spring	MR-19	1
1-39	HZ425507	P.B. Head Hold-down Table	MS-0005	1
1-40	MS317891	PH Shaft	MR-11	1
1-41	HZ298012	4-TR Hold-down Base Guide	3A-69	1
1-42	ZW432663	Screw, countersunk head 2.3x6		1
1-43	ZG317902	PH Spring	MR-13	1
1-44	ZW317913	Spring Holder	MR-12	1
1-45	ZW290283	'U' Ring 2.85M	6-1-1	2
1-46	HP384524	P.B. HEAD P4-200		1
1-47	HZ428387	Head Angle	MS-0007	1
1-48	ZW201475	Screw, pan head 2x3		6
1-49	HZ382667	Triple-shield	RD-A3	1
1-50	ZW426622	Washer (SPC) D3.4x7.8x0.5t		2
1-51	ZW403312	Hexagon Bolt 3x4		2
1-52x	EA463206	P.C. Board, Terminal A	RD-A36	4
1-53	HZ425520	P.B. Head Adjust Table	MS-0006	1
1-54	ZW202691	Screw, round head 3x4		2
1-55	ZG425531	P.B. Head Spring	MS-0008	3
1-56	ZW345914	Screw, round head 3x10		4
1-57	ZG303300	Angle Adjust Spring B	RD-55	1
1-58	ZG315011	Brake Lever Spring	MR-116	2
1-59	HR384513	REC. HEAD R4-200		1
1-60	HZ425564	RH Angle	MS-0009	1
1-61	ZG206144	Angle Adjust Spring	RD-16	3
1-62	ZW336868	Screw, round head 3x12		3
1-63	ZW273881	Earth Lug, M4		1
1-64	HE412187	ERASE HEAD E4-250		1
1-65	HZ425575	Erase Head Base	MS-0010	1
1-66	ZW323728	Screw, binding head 3x5		2
1-67	HL425608	Shifter Lever B, w/shaft	MS-0012	1
1-68	ZW340672	XR Idler Lever Screw	XR-370	1
1-69	HZ425643	Cancel Coil Table	MS-0016	1
1-70	EO537208	Hum Backing Coil 15T	23-3-37	2
1-71	ZW413223	Screw, binding head 3x5, w/washer		2
1-72	ZW323728	Screw binding head 3x5		2
1-73	HZ231884	Tape Guide B	RD-5	1
1-74	ZW384840	Set Screw 3x5 (cup)		1

REEL MOTOR & REEL TABLE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
2-1	BM314741	Reel Motor Block Comp. 24x0.2	MS, MC, MR, KD	1
2-2x	BR426036	Reel Table Block Comp. (Take-up)	MS	1
2-3x	BR426025	Reel Table Block Comp. (Supply)	MS	1
2-4	MT425970	MS Reel Table Disc	MS-2001	1
2-5	MT255420	Reel Retainer	3R-102	1
2-6	MS342000	Reel Shaft	3R-108	1
2-7	ZG255633	Reel Spring	3R-109	1
2-8	MT297663	3R 'O' Ring 2.9x1.65M	3R-139	1
2-9	ZW270088	'E' Ring 1.9M	6-1-9	1
2-10	MT397225	Reel Table Rubber	KD-2017	1
2-11	MT495606	Brake Drum (R) A (Take-up)	MR-216	1
2-12x	MT495617	Brake Drum (L) A (Supply)	MR-216	1
2-13x	ZW273778	Earth Lug, M3		2
2-14x	ZW425981	Screw, binding head 3x3		2
2-15	MT436860	Brake Cloth Comp.	MR-269	1
2-16	ZG317496	Felt Tension Spring	MR-260	1
2-17	ZW424056	Screw, pan head 4x10		2
2-18	ZW425992	Screw, countersunk head 3x8		3
2-19	MR426958	Counter Pulley (Take-up)	MS-6012	1
2-20	ZW516655	Screw, countersunk head 2.3x8		2
2-21	MZ317373	Brake Lever Prop	MR-102	2
2-22x	ZW413188	Nut, M4		2
2-23	ML314976	Brake Lever A (Take-up)	MR-210	1
2-24x	ML396810	Brake Lever B (Supply)	KD-1038	1
2-25	MB314987	Brake Band	MR-213	2
2-26	MZ314998	Brake Band Retaining Plate	MR-212	4
2-27x	ZW417137	Screw, binding head 3x4		8
2-28	MZ315000	Brake Band Support	MR-214	2
2-29	ZG315011	Brake Lever Spring	MR-116	2
2-30	ZW290283	'U' Ring 2.85M	6-1-1	2
2-31x	ZW323728	Screw, binding head 3x5		4
2-32	MZ317406	Brake Band Guide, w/base	MR-120	2
2-33	MB303535	Counter Belt D91x1.6	3A-617	1

FIG. 2 ILLUSTRATION OF REEL MOTOR & REEL TABLE BLOCK

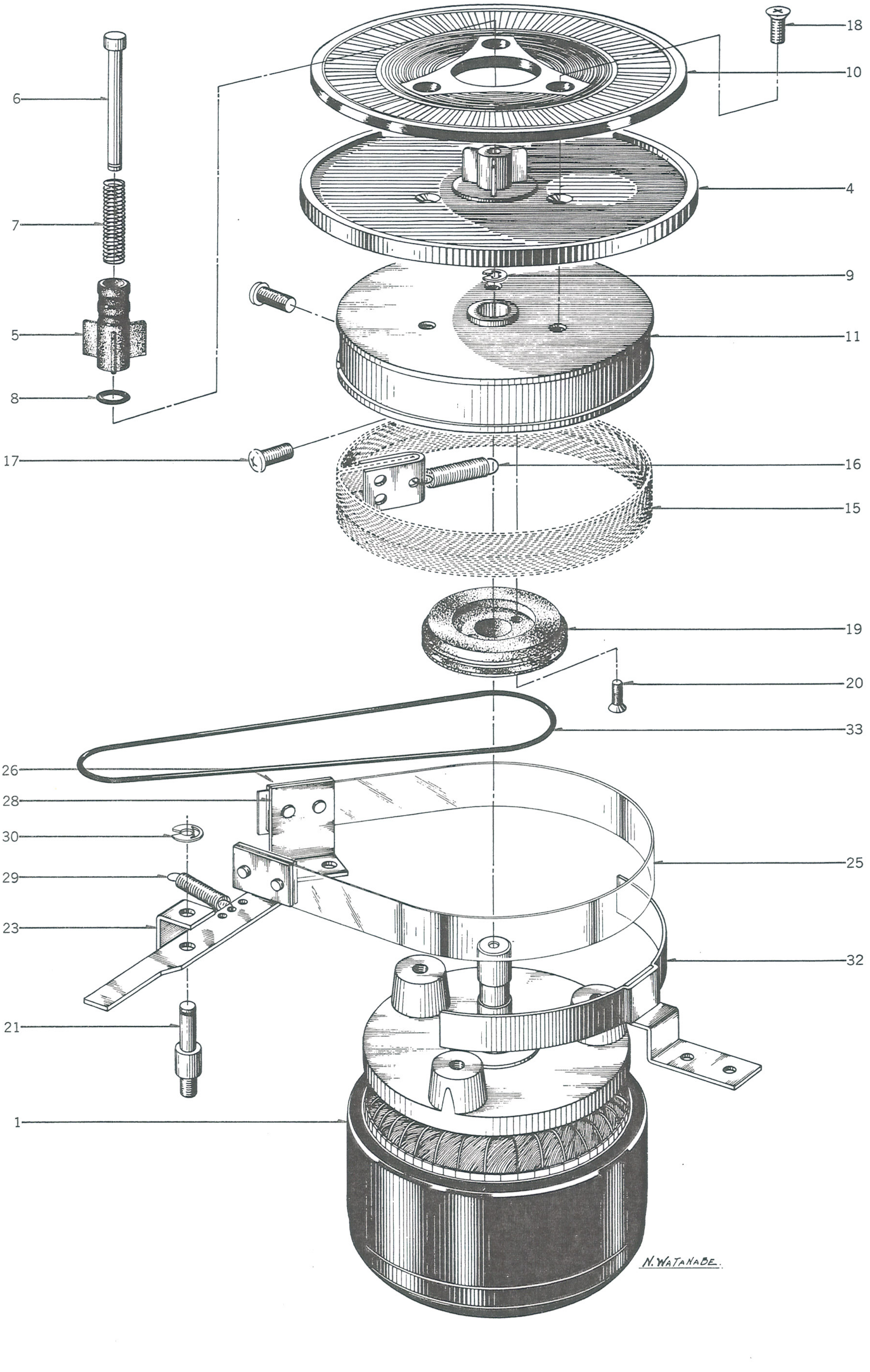
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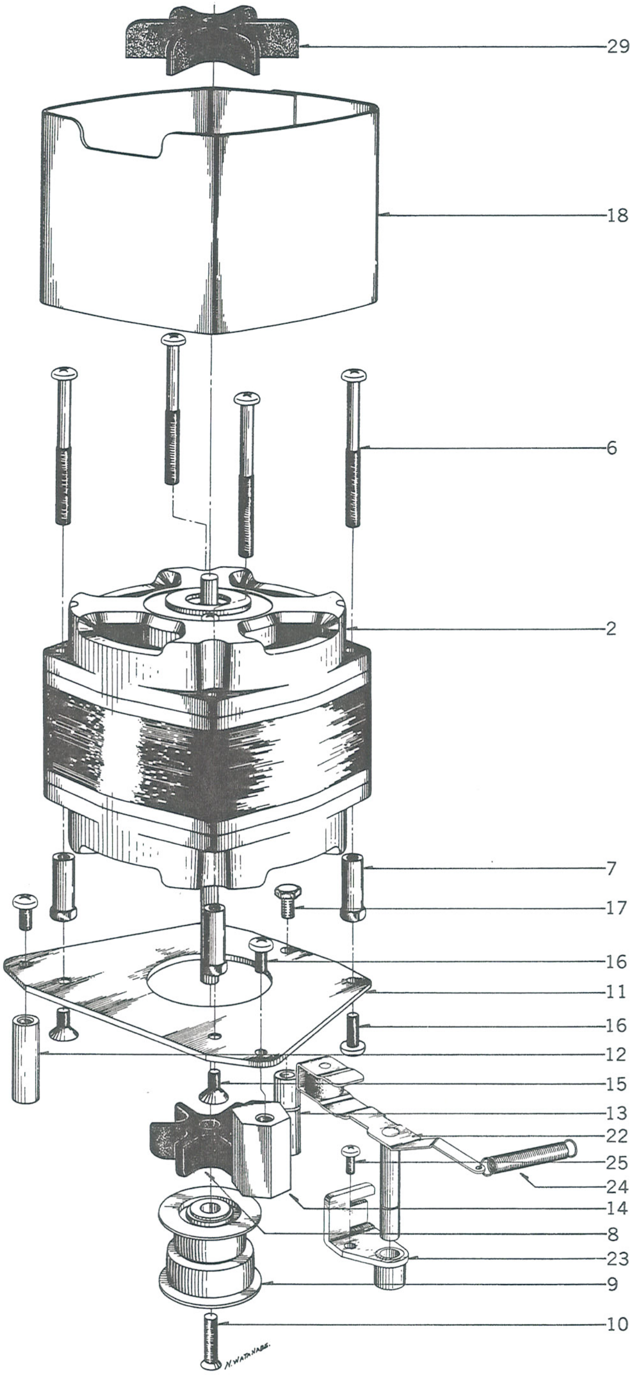
FIG. 3 ILLUSTRATION OF MAIN MOTOR BLOCK



MAIN MOTOR BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
3-1x	BM437040	Main Motor Block Comp.	MS-2,3,MR	1
3-2	MZ448222	24 Motor Cover, w/metal	24X-781	2
3-3x	ZW228025	Thrust Adjust Washer A 0.1t	24X-714	8
3-4x	ZW228036	Thrust Adjust Washer B 0.25t	24X-715	8
3-5x	ZW228194	Thrust Washer (Nylon) 0.5t	24X-717	2
3-6	ZW201745	Screw, pan head 4x50, w/washer		4
3-7	MZ254327	Motor Mt. Prop	16X-707	4
3-8	MZ316247	MR Motor Fan	MR-719	1
3-9	MR437602	MC Motor Pulley	MC-7002	1
3-10	ZW203016	Screw, oval countersunk head 3x15		4
3-11	MZ316293	MR Motor Mt. Plate	MR-717	1
3-12	MZ254160	Motor Prop A	24X-730	1
3-13	MZ254182	Motor Prop B	24X-731	1
3-14	MZ316304	MR Motor Prop	MR-706	1
3-15	ZW427026	Screw, countersunk head 4x10		2
3-16	ZW424056	Screw, pan head 4x10		4
3-17	ZW272395	M-7 Motor Prop Retaining Screw	24X-732	1
3-18	MZ316326	Motor Out-side Shield (large) A	10R-714	1
3-19x	MZ337724	Motor Out-side Shield (large) B	10R-716	1
3-20x	MZ292364	XR Motor Shield Plate B	XR-705	1
3-21x	BL437038	Belt Change Lever Block Comp.	D	1
3-22	ML437591	Belt Change Lever D (small), w/roller	MC-2011	1
3-23	MZ248354	Belt Guide Stop, w/metal	4TR-221	1
3-24	ZG217337	Belt Return Spring	4TR-224	1
3-25	ZW417150	Screw, pan head 4x6		1
3-26x	ZG217394	Belt Change Spring B	MH-125	1
3-27x	ZW260054	Washer (SUP) D6.1x10x0.25t		1
3-28x	ZW290283	'U' Ring 2.85M	6-1-1	1
3-29	MZ254441	Motor Fan (large)	RD-640	1
3-30x	MZ404820	Dust Cover Plate (Nylon)D24x1t	RD-A640	1

FIG. 4A ILLUSTRATION OF FLYWHEEL BLOCK

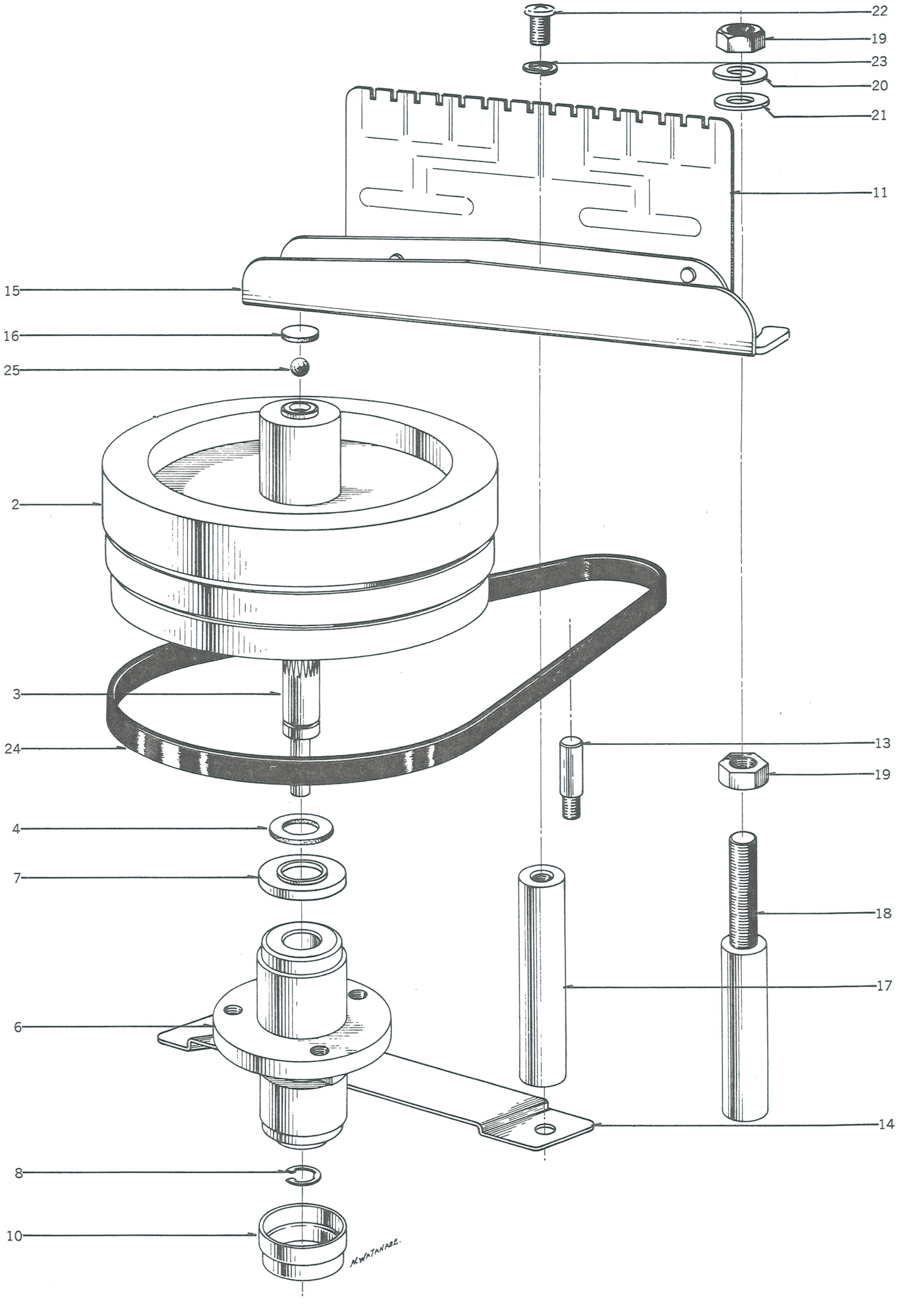

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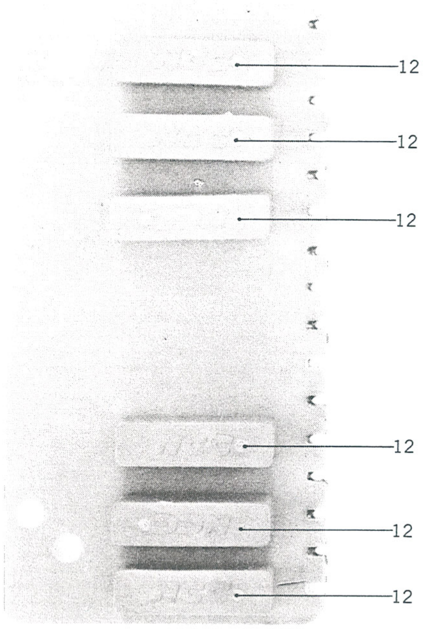
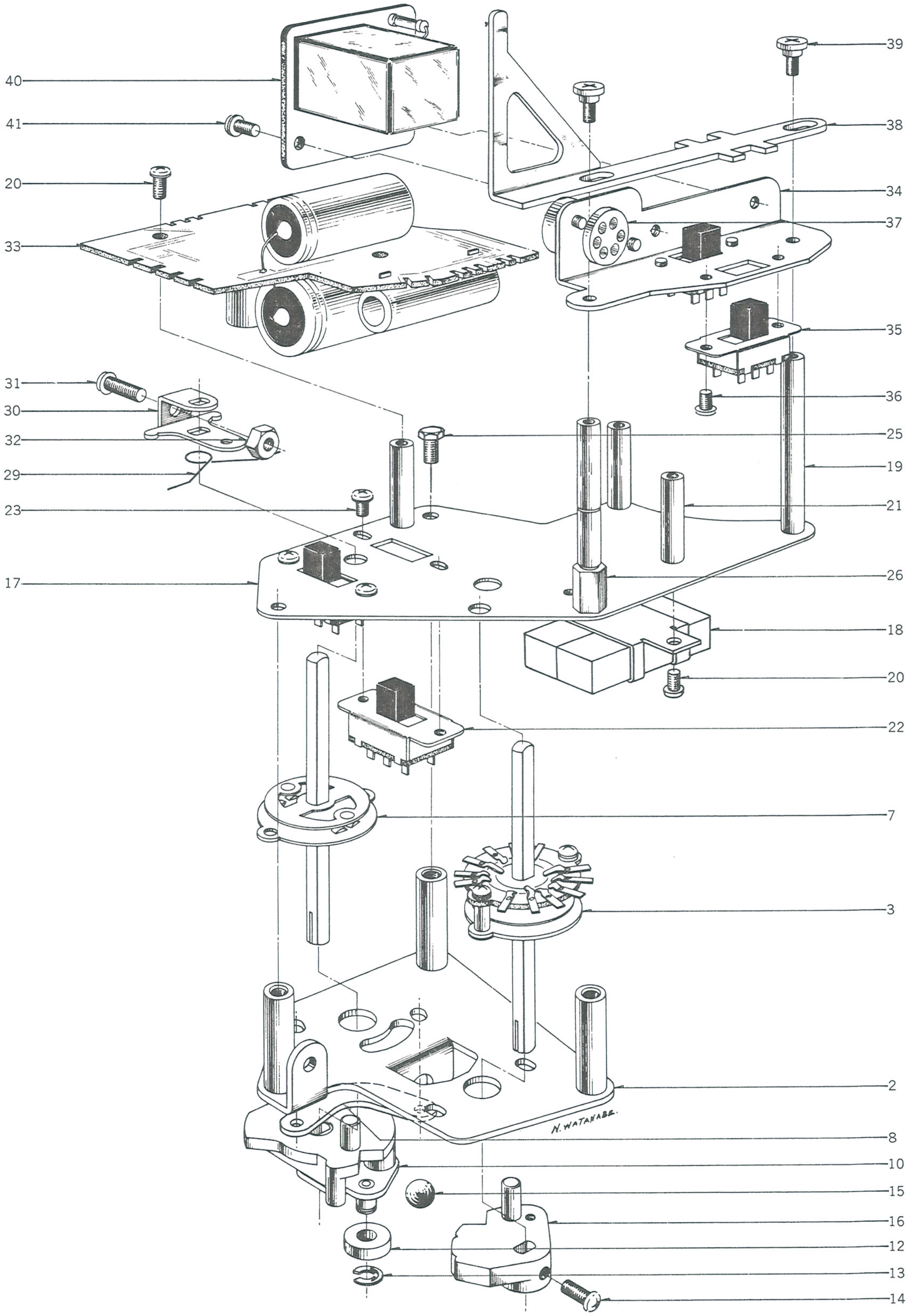
FIG. 4B PHOTO OF FLYWHEEL BLOCK



FLYWHEEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-1x	BF476550	Flywheel Block Comp.	MS-2,3,MR	1
4-2	MZ296245	Flywheel 24	MH-202	1
4-3	MS476572	D6 Main Shaft	MR-2005	1
4-4	ZW447208	Flywheel Thrust B D7.9x13x0.5t	101025	1
4-5x	ZW373577	Set Screw, hexagon socket 5x6 (flat)		2
4-6	MZ296256	Main Case A 24, w/metal	MH-206	1
4-7	MZ446635	Thrust Cap, Main Metal B2	LF-2006	1
4-8	ZW244710	Flywheel Fixing Pin	900-250	1
4-9x	MZ244113	Felt D12.5x16x2t		1
4-10	MZ253113	Main Metal Cap B	MH-208	1
4-11	BA334541	Spark Quencher P.C. Board Comp. (MR-507)		1
4-12	ER450797	Spark Quencher U/L 0.033μ+120 400WV	41-1-34	6
4-13	MZ248343	Belt Guide Pin	4TR-109	1
4-14	MB439525	Flywheel Belt Holding Plate B	MS-1014	1
4-15	MZ314897	Flywheel Supporting Plate MR	MR-121.	1
4-16	ZW392681	Washer, without hole (Nylon) D8x1t		1
4-17	MZ273036	M9 Flywheel Prop A	M9-310	1
4-18	MZ273047	M9 Flywheel Prop B	M9-311	1
4-19	ZW413280	Inch Nut, 1/4" (P20)		2
4-20	ZW393232	Spring Washer, 1/4"		1
4-21	ZW413998	Washer (SUP) D6.8x12.7x1t		1
4-22	ZW413201	Screw, pan head 4x8		1
4-23	ZW273914	Spring Washer, M4		1
4-24	MB437703	MC Flywheel Belt	MC-1015	1
4-25	MV269965	Steel Ball D4		1
4-26x	ZW323728	Screw, binding head 3x5		2

FIG. 5 ILLUSTRATION OF SWITCH BLOCK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N. WATANABE

SWITCH BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
5-1x	BS433787	Switch Block Comp.	MS	1
5-2	HZ402390	Switch Table A-2 (MR), w/prop	MR-201	1
5-3	ES425924	Play Shaft (Y Type) Y-263-2	25-7-24	1
5-4x	ZW460157	Washer (SPC) D3.1x8x0.8t		2
5-5x	ZW348107	ISO Nut, M3		2
5-6x	ER345756	Carbon/R. RD1/4 68k (J) (Insu. type)	35-9-5	1
5-7	ES316934	Y type Rwd Shaft	25-8-5	1
5-8	MZ316945	Nut Plate	MR-245	1
5-9x	ZW413728	Screw, binding head 3x6, w/washer		2
5-10	MZ316956	Cam A-3, w/plate	MR-242	1
5-11x	ZW259942	Washer(Fiber) D5.1x10.3x0.5t		1
5-12	MR269730	Cam Roller D12	900-213	1
5-13	ZW290283	'U' Ring 2.85M	6-1-1	1
5-14	ZW413201	Screw, pan head 4x8		2
5-15	MV270066	Steel Ball D8		1
5-16	MZ217271	Cam B, without tap	900-206	1
5-17	MZ316967	Control Chassis	MR-202	1
5-18	ER477663	Cement/R. H (15+15) H1A (22.5+22.5) K220J	35-16-33	1
5-19	MZ316978	Cycle Switch Prop	MR-207	1
5-20	ZW413223	Screw, binding head 3x5, w/washer		7
5-21	MZ364691	Sys. Con. P.C. Board Prop	MR-264	3
5-22	ES375478	Slide Switch ESD-279DU	25-3-23	2
5-23	ZW371856	ISO Screw, binding head 3x5		3
5-24x	ER376413	Spark Quencher U/L 0.033μ+120 500WV	41-1-37	1
5-25	MZ425935	Hexagon Bolt 4x8, w/washer		2
5-26	MZ317046	Rec. Lever Prop	MR-206	1
5-27x	MZ373318	Nylon Clip HP-3N		1
5-28x	ZW321298	ISO Screw, binding head 3x8		1
5-29	ZG225516	Switch Spring	MR-255	1
5-30	MZ317024	Switch Cam	MR-204	1
5-31	ZW424056	Screw, pan head 4x10		1
5-32	ZW413188	Nut, M4		1
5-33	BA324088	Sys. Con. P.C. Board Comp. (MR-504)		1
5-34	MZ425946	Frequency Switch Table	MS-2002	1
5-35	ES317531	Slide Switch ESD-271DU	25-3-24	2
5-36	ZW384131	Screw, round head 3x5		4
5-37	EJ365703	6P Socket	31-1-67	1
5-38	ML317542	Cycle Change Lever MR	MR-209	1
5-39	ZW207314	Amp. Lever Set Screw	3A-737	2
5-40	BA317081	Tension Relay P.C. Board Comp. (MR-558)		1
5-41	ZW413223	Screw, binding head 3x5, w/washer		2
5-42x	EJ293062	12P Mate-N-Lock Cap Housing 1-480278-0	52-1-1	1
5-43x	EJ373623	Pin Contact 61116-1	52-1-1	12
5-44x	EJ317125	5P TV-Consent-Plug	42-1-6	1

FIG. 6A ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK

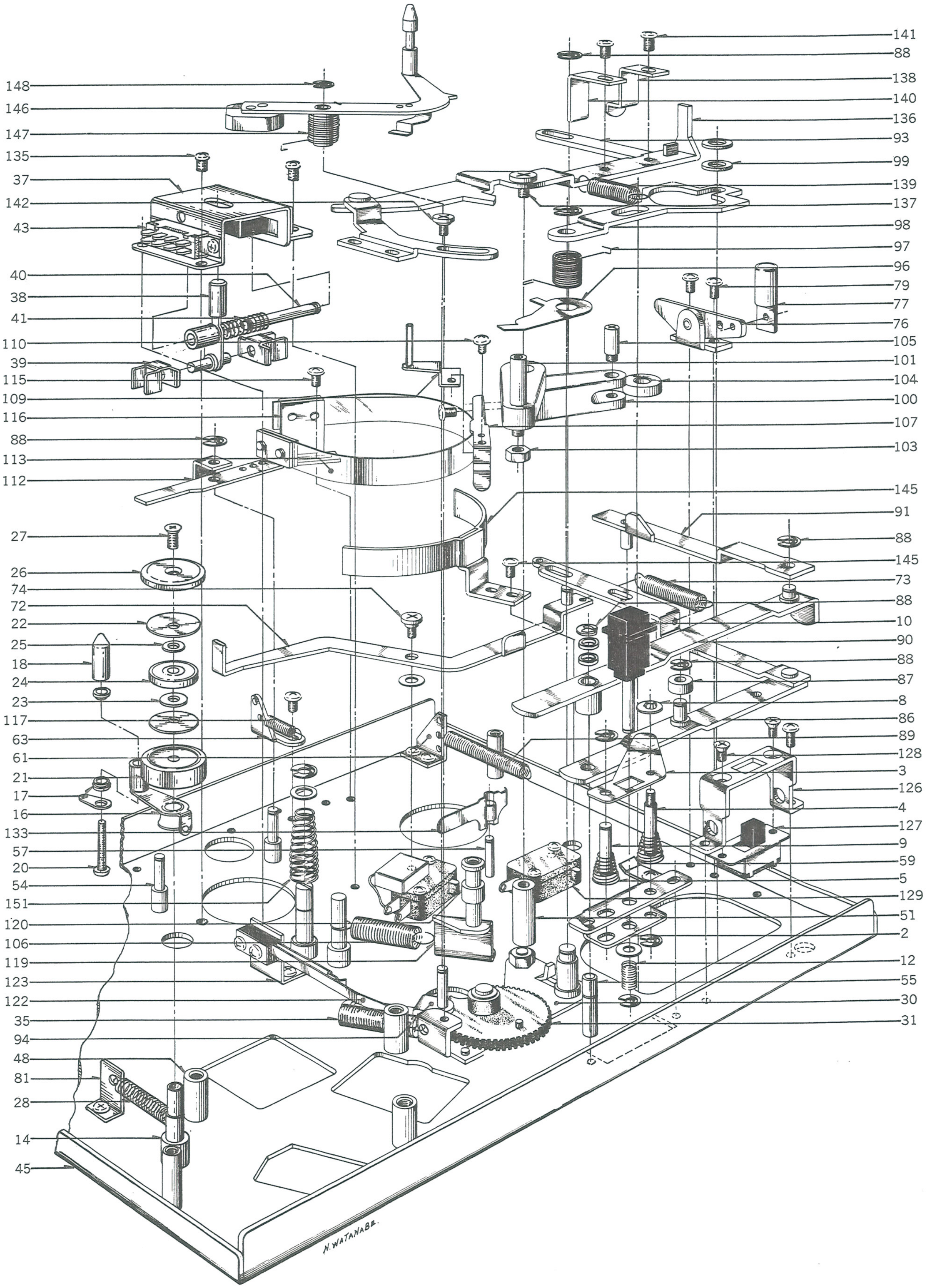
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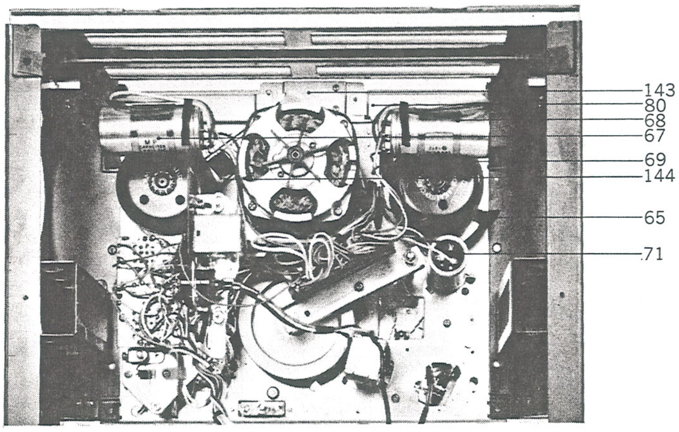
FIG. 6B PHOTO OF MECHANISM ASSEMBLY BLOCK

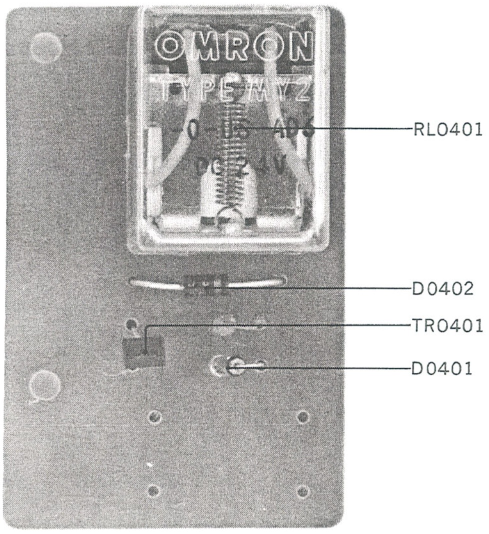


MECHANISM ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	REC. BUTTON BLOCK			
6-1x	BZ314820	Rec. Button Block Comp.	MS,MR,MC	1
6-2	MZ316708	Stopper Table	MR-219	1
6-3	MZ316710	Cam Stopper	MR-220	1
6-4	MS316721	Stopper Shaft	MR-221	1
6-5	ZG316732	Cone Spring	MR-244	2
6-6x	ZW322525	Washer (PBP) D4.1x7x0.2t		1
6-7x	ZW290283	'U' Ring 2.85M	6-6-1	3
6-8	ZW432944	Push Nut 3x10x0.3t		1
6-9	MS316776	Stopper Shaft B	MR-259	1
6-10	SB316754	Rec. Button	MR-222	1
6-11x	ZW259830	Washer (SPC) D4.5x9.8x0.5t		1
6-12	ZG316765	Rec. Button Spring	MR-252	1
	GUIDE ROLLER BLOCK			
6-13x	BZ426058	Guide Roller Block Comp.	MS	1
6-14	MS425452	Guide Roller Shaft	MS-2010	1
6-15x	ZW260054	Washer (SUP) D6.1x10x0.25t		1
6-16	ML425463	Tension Arm, w/pulley	MS-2011	1
6-17	HZ317632	Insulator Collar A	MR-36	2
6-18	HZ318060	Sensing Post	MR-34	1
6-19x	ZW316800	Earth Lug, M2.6		1
6-20	ZW383343	Screw, binding head 2.3x22		1
6-21	HZ425496	Tape Guide Table A'	MS-2014	1
6-22	ZW231805	Tape Guide Washer (large)	3A-356	2
6-23	ZW259885	Washer(PBP) D5.1x10.3x0.1t		1
6-24	MV248117	Bearing 635AHZZ-CIE-B32		1
6-25	ZW432753	Washer (PBP) D3.1x8x0.2t		1
6-26	EZ317092	Tape Guide Table B	MR-32	1
6-27	ZW200441	Screw, countersunk head 3x8		1
6-28	ZG317114	Tension Lever Spring	MR-39	1
	ECCENTRIC GEAR BLOCK			
6-29x	BZ248027	Eccentric Gear Block Comp.	MS,MR,MC,M9	1
6-30	MZ248016	Eccentric Gear Table, w/shaft	4TR-243	1
6-31	MZ248005	Eccentric Gear	4TR-245	1
6-32x	ZW861344	Washer (PBP) D6.1x10x0.4t		1
6-33x	ZW260144	Washer (Nylon) D6.1x10x0.3t		1
6-34x	ZW290283	'U' Ring 2.85M	6-1-1	1
6-35	ZG437253	Eccentric Gear Return Spring	MS-2022	1
	SPEED CHANGE BLOCK			
6-36x	BZ426014	Speed Change Block Comp.	MS	1
6-37	MZ425338	Switch Table	MS-2003	1
6-38	ML425340	Switch Lever, w/metal	MS-2004	1
6-39	MZ425384	Knob Holder	MS-2007	2
6-40	MS425373	Shaft	MS-2008	1
6-41	ZG432371	Switch Lever Spring	MS-2021	1
6-42x	ZW270088	'E' Ring 1.9M	6-1-9	2
6-43	ES316866	Slide Switch ESD-281DU	25-3-27	2
6-44x	ZW323728	Screw, binding head 3x5		4
	ASSEMBLY BLOCK			
6-45	MZ425744	MS Mech. Frame, w/pin	MS-1001	1
6-46x	EJ339107	Lug Plate KP2L	33-3-20	1
6-47x	EJ368853	Lug Plate VB1L	33-4-8	1
6-48	MZ425755	Head Base Plate Prop	MS-1006	3
6-49x	ZW413201	Screw, pan head 4x8		2
6-50x	ZW414044	Screw, countersunk head 4x8		1
6-51	MS317362	Pinch Roller Arm Shaft	MR-125	1
6-52x	ZW274026	Spring Washer, M5		1
6-53x	ZW413278	Nut, M5		1
6-54	MZ317373	Brake Lever Prop	MR-102	2
6-55	MS272428	M-7 A Lever Shaft	MH-110	1
6-56x	ZW413267	Flange Nut, M4		1
6-57	UC250536	Micro Lever Shaft	3A-239	1
6-58x	ZW273688	Nut, M2.3		1
6-59	MZ217697	Pause Lever Stopper Plate	M9-113	1
6-60x	MZ256814	Rewind Shaft Spacer	M9-124	2
6-61	MZ227340	Spring Rack B	900-172	1
6-62x	ZW323728	Screw, binding head 3x5		8
6-63	MZ314605	MR Spring Rack	MR-104	2
6-64x	ZW202116	Screw, binding head 3x5, w/lug		1
6-65	MZ314673	Reel Motor Shield	MR-123	1
6-66x	MZ339388	Capacitor Retaining Plate	MR-127	2
6-67	EC339377	MP/C. 3+1μF 260WV AC (right) (Lug type OP./D.)		1
6-68	EC365040	MP/C. 3+1μF 260WV AC(left) (Lug type OP./D.)	24-9-42	1
6-69	ER376435	Spark Quencher U/L 0.1μ+120 250WV	41-1-35	2
6-70x	ZW200687	Tapping Screw #2 3x6(round)		2
6-71	EC314662	MP/C. 2+1μF 250WV AC (Lug type Uni/D.)	24-9-34	1
6-72	ML314684	Brake Lever C, w/pin	MR-227	1
6-73	ZG314706	Spring IB	MR-115	1
6-74	ZW314717	MR Graduated Screw	MR-254	1
6-75x	ZW432347	Washer D6.2x13x0.125t (lumilar)		1
6-76	ML226258	Start Lever A, w/lever C	4TR-122	1
6-77	SB485741	Start Button C	MS-1002	1
6-78x	ZW314728	Cotter Pin 1.6x8		1
6-79	ZW425788	Screw, round head 3x4		2
6-80	MZ425766	Frame Top Member (MS), w/angle	MS-6011	1
6-81	MZ425902	Spring Hanger	MS-1088	1
6-82x	ZW330412	Adjust Washer (U) D4x13x0.13t		1
6-83x	ZW330423	Adjust Washer(U) D4x13x0.25t		1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
6-84x	ZW330434	Adjust Washer(U) D4x13x0.5t		1
6-85x	ZW330445	Adjust Washer (U) D4x13x0.8t		1
6-86	ML314763	MR Lever B, w/lever D	MR-122	1
6-87	MR314785	Cam Roller D9	MR-237	1
6-88	ZW290283	'U' Ring 2.85M	6-1-1	6
6-89	ZG314818	D Lever Spring	MR-114	1
6-90	ML334506	MR Lever A, w/metal	MR-126	1
6-91	ML314842	MR Lever C	MR-108	1
6-92x	ZW419826	Washer (Fiber) D6.2x10x1t		2
6-93	ML314864	IB Lever	MR-111	1
6-94	MZ260662	AS Lever Prop Base, w/prop	4TR-236	1
6-95x	ZW202116	Screw, binding head 3x5, w/lug		1
6-96	MZ218125	Gear Stopper	4TR-120	1
6-97	ZG226697	Stopper Spring	4TR-121	1
6-98	ML228868	Auto Mech. Control Lever	4TR-125	1
6-99	ZW260087	Washer (Fiber) D6.1x10x0.5t		1
6-100	ML314932	MR Pinch Roller Lever	MR-119	1
6-101	MS243404	Pinch Roller Shaft C	4TR-102	1
6-102x	ZW259975	Washer (SUP) D5.1x10.3x0.8t		1
6-103	ZW413188	Nut, M4		4
6-104	MR269763	Cam Roller D13	900-154	1
6-105	MS217192	Cam Roller Shaft A	900-130	1
6-106	ZG455692	Pinch Roller Spring (MS)	MS-1015	1
6-107	ML425790	Shifter Lever A	MS-1003	1
6-108x	ZW413223	Screw, binding head 3x5, w/washer		2
6-109	MZ425801	Shifter Stand, w/pin	MS-1004	1
6-110	ZW323728	Screw, binding head 3x5		1
6-111x	ZW314943	D8 Washer	MR-113	1
6-112	ML314976	Brake Lever A (Take-up)	MR-210	1
6-113	MB314987	Brake Band	MR-213	2
6-114x	MZ314998	Brake Band Retaining Plate	MR-212	4
6-115	ZW417137	Screw, binding head 3x4		8
6-116	MZ315000	Brake Band Support	MR-214	2
6-117	ZG315011	Brake Lever Spring	MR-116	2
6-118x	ML396810	Brake Lever B (Supply)	KD-1038	1
6-119	HZ315077	Reverse Guide Base w/prop	MR-229	1
6-120	HZ315090	Reverse Guide	RD-225	1
6-121x	ZW344463	Set Screw, hexagon socket 4x6 (cup)		1
6-122	ES488935	Tension Switch Comp. MS-2	MS-1011	1
6-123	MZ381701	Switch Angle Base	MR-262	1
6-124x	ZW273778	Earth Lug, M3		1
6-125x	ZW427048	Screw, round head 3x3		2
6-126	MZ210071	Auto. Switch Plate	M8-114	1
6-127	ES375478	Slide Switch ESD-279DU	25-1-23	1
6-128	ZW440291	ISO Screw, countersunk head 3 x6		2
6-129	ES438535	Micro Switch V-1A442 U/L	25-1-15	2
6-130x	ER376435	Spark Quencher U/L 0.1μ+120 250WV	41-1-35	1
6-131x	ZW486358	Screw, round head 3x15		3
6-132x	ZW439514	Screw, binding head 3x18		1
6-133	ML316394	Operation Switch Lever	MR-112	1
6-134x	ZW270088	'E' Ring 1.9M	6-1-9	1
6-135	ZW425788	Screw, round head 3x4		3
6-136	ML316427	MR Pause Lever, w/lever B	MR-233	1
6-137	ZW217877	Pause Lever Retaining Screw	900-136	1
6-138	MZ316451	M-7 Pause Stopper	MH-126	1
6-139	ZG301061	Pause Spring 990A	4TR-128	1
6-140	ML316440	Shut-off Switch Lever	MR-234	1
6-141	ZW323728	Screw, binding head 3x5		6
6-142	ZW207314	Amp. Lever Set Screw	3A-737	1
6-143	MC399521	Counter M-470D	9-1-14	1
6-144	MB303535	Counter Belt D91x1.6	3A-617	1
6-145	MZ317406	Brake Band Guide, w/base	MR-120	2
6-146	BL316484	AS Lever Comp.	MS,MR,MC	1
6-147	ZG260706	AS Lever Spring	4TR-118	1
6-148	ZW290294	'U' Ring 2.85M	6-1-1B	1
6-149x	MP271170	LC Pinch Roller	LC-321	1
6-150x	EJ205975	Cramp Terminal 1-SD	32-1-7	2
6-151	ZG217394	Belt Change Spring B	μH-125	1

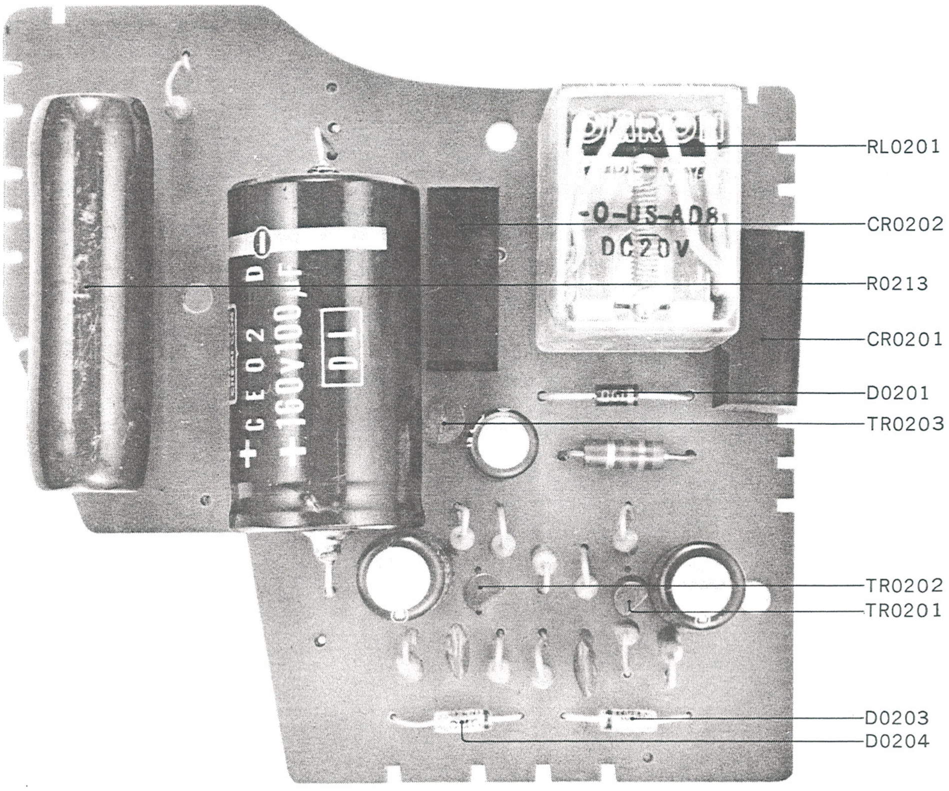
FIG. 7 PHOTO OF TENSION RELAY P.C. BOARD (MR-558)



TENSION RELAY P.C. BOARD (MR-558) BLOCK

Symbol No.	Parts No.	Description	Q'ty
7-1x	BA317081	Tension Relay P.C. Board Comp. (MR-558)	1
7-TR0401	ET234808	Transistor 2SC372(Y)	1
7-D0401	ED219464	Germanium Diode 1N34A	1
7-D0402	ED224526	Silicon Diode 10D1	1
7-RL0401	EP325585	Relay MY2-O-US-AD6-24V	1
7-R0401	ER212264	Carbon Resistor RD1/4 22k(J) (Stop. type)	1

FIG. 8 PHOTO OF SYS. CON. P.C. BOARD (MR-504)

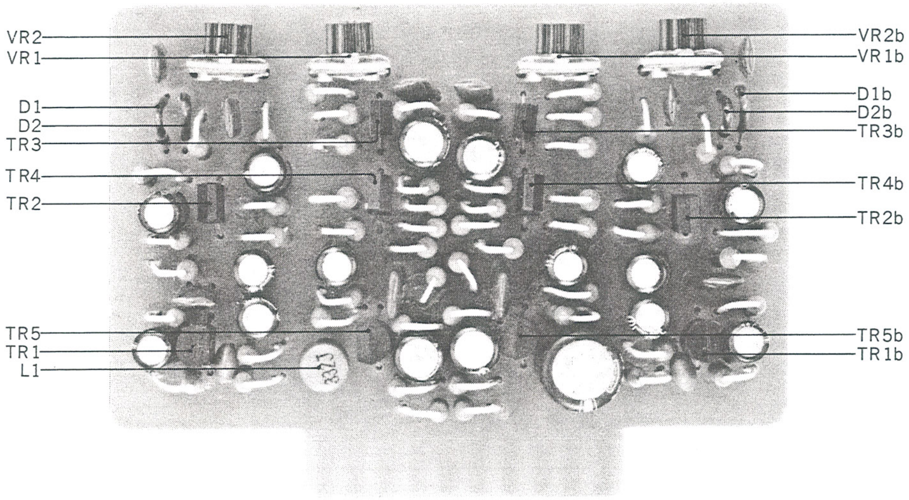


SYS. CON. P.C. BOARD (MR-504) BLOCK

Symbol No.	Parts No.	Description	Q'ty
8-1x	BA324088	Sys. Con. P.C. Board Comp. (MR-504)	1
8-TR0201,2	ET398711	Transistor 2SC945(Q)(R)	2
8-TR0203	ET430907	Transistor 2SC1211(C)(D)	1
8-D0201	ED224526	Silicon Diode 10D1	1
8-D0202	ED224550	Silicon Diode 10D4	1
8-D0203,4	ED219464	Germanium Diode 1N34A	2
8-CR0201	ER376424	Spark Quencher U/L 0.1μ+120 500WV	1
8-CR0202	ER450786	Spark Quencher U/L 0.1μ+120 400WV	1
8-RL0201	EP316001	Relay MY4-O-US-AD8 20V	1
		Capacitor, Vertical Type	
8-C0201	EC320040	Elect. 47μF 16WV	1
8-C0202	EC220127	Elect. 100μF 16WV	1
8-C0203,4	EC251087	Mylar 0.022μF(K) 50WV	2
8-C0205	EC220127	Elect. 100μF 16WV	1
8-C0206	EC316091	Elect. 100μF 160WV (Tub. type)	1
8-C0207	EC316113	Elect. 47μF 160WV (Tub. type)	1
8-C0208	EC308711	Mylar 0.047μF(K) 50WV	1

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
8-R0201	ER357456	Carbon RD1/4 2.2k(J)	1
8-R0202	ER336442	Carbon RD1/4 10k(J)	1
8-R0203	ER346601	Carbon RD1/4 47k(J)	1
8-R0204,5	ER336442	Carbon RD1/4 10k(J)	2
8-R0206,7	ER342933	Carbon RD1/4 27k(J)	2
8-R0208	ER361642	Carbon RD1/4 47(J)	2
8-R0209	ER336442	Carbon RD1/4 10k(J)	1
8-R0210	ER357456	Carbon RD1/4 2.2k(J)	1
8-R0211	ER316078	Solid RC1/2W 1.8k(K)	1
8-R0212	ER380711	Carbon RD1/4 220k(J)	1
8-R0213	ER316080	Enamel RWH15G 1.5k(J) (Term. type)	1

FIG. 11 PHOTO OF NOISE REDUCTION P.C. BOARD (MS-5215)

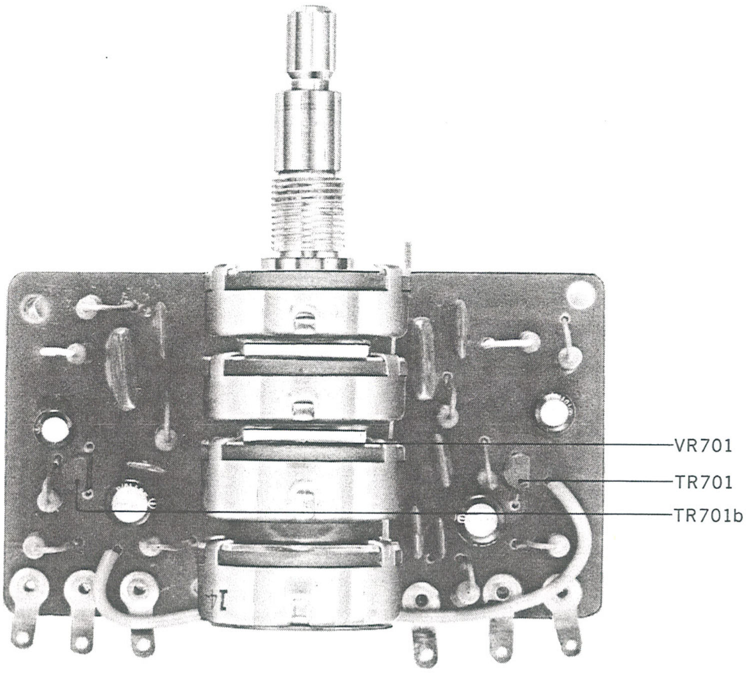


NOISE REDUCTION P.C. BOARD (MS-5215) BLOCK

Symbol No.	Parts No.	Description	Q'ty
11-1x	BA487405	Noise Reduction P.C. Board Comp. (MS-5215)	1
11-TR1	ET380834	Transistor 2SC711(E)	2
11-TR2,3,4	ET234854	Transistor 2SC458LG(C)	6
11-TR5	ET380834	Transistor 2SC711(E)	2
11-D1,2	ED514721	Silicon Diode WG-599	4
11-L1	EO243988	Ferri Inductor FL7H 3.3MH(J)	1
11-VR1	EV498071	Semi-fixed Volume V10K8-1-5 1kB (4US)	2
11-VR2	EV499353	Semi-fixed Volume V10K8-1-5 300kB	2
		Capacitor, Vertical Type	
11-C1	EC320051	Elect. 10µF 16WV	2
11-C2	EC474671	VFM 10PF(K) 50WV	2
11-C3	EC450527	Elect. 4.7µF 25WV	2
11-C4	EC411827	Mylar 0.0082µF(J) 50WV	2
11-C5	EC220432	Elect. 2.2µF 25WV	2
11-C6	EC478945	Elect. 2.2µF 25WV(Noiseless)	2
11-C7	EC350875	Mylar 0.001µF(J) 50WV	2
11-C8	EC220432	Elect. 2.2µF 25WV	2
11-C9	EC380621	Mylar 0.0068µF(J) 50WV	2
11-C10	EC220994	Elect. 10µF 25WV	2
11-C11	EC350875	Mylar 0.001µF(J) 50WV	2
11-C12	EC220432	Elect. 2.2µF 25WV	2
11-C13	EC311793	Mylar 0.012µF(J) 50WV	2
11-C14	EC220994	Elect. 10µF 25WV	2
11-C15	EC220151	Elect. 100µF 25WV	1

Symbol No.	Parts No.	Description	Q'ty
		Resistor, Stopper Type	
11-R1	ER350100	Carbon RD1/4 68k(J)	2
11-R2	ER346601	Carbon RD1/4 47k(J)	2
11-R3	ER363644	Carbon RD1/4 560(J)	2
11-R4	ER343078	Carbon RD1/4 2.7k(J)	2
11-R5	ER212477	Carbon RD1/4 3.3k(J)	2
11-R6	ER380711	Carbon RD1/4 220k(J)	2
11-R7	ER212264	Carbon RD1/4 22k(J)	2
11-R8	ER357456	Carbon RD1/4 2.2k(J)	2
11-R9	ER361563	Carbon RD1/4 180(J)	2
11-R11	ER343078	Carbon RD1/4 2.7k(J)	2
11-R12	ER211465	Carbon RD1/4 1k(J)	2
11-R13	ER362024	Carbon RD1/4 820k(J)	2
11-R14	ER361528	Carbon RD1/4 56k(J)	2
11-R15	ER213030	Carbon RD1/4 5.6k(J)	2
11-R16	ER361563	Carbon RD1/4 180(J)	2
11-R17	ER212477	Carbon RD1/4 3.3k(J)	2
11-R18	ER357456	Carbon RD1/4 2.2k(J)	2
11-R19	ER429996	Carbon RD1/4 470k(J)	2
11-R20	ER361528	Carbon RD1/4 56k(J)	2
11-R21	ER212883	Carbon RD1/4 4.7k(J)	2
11-R22,23	ER304402	Carbon RD1/4 470(J)	4
11-R24	ER420322	Carbon RD1/4 36k(J)	2
11-R25	ER211757	Carbon RD1/4 100k(J)	2
11-R26	ER212883	Carbon RD1/4 4.7k(J)	2
11-R27	ER336442	Carbon RD1/4 10k(J)	2
11-R28	ER357456	Carbon RD1/4 2.2k(J)	2

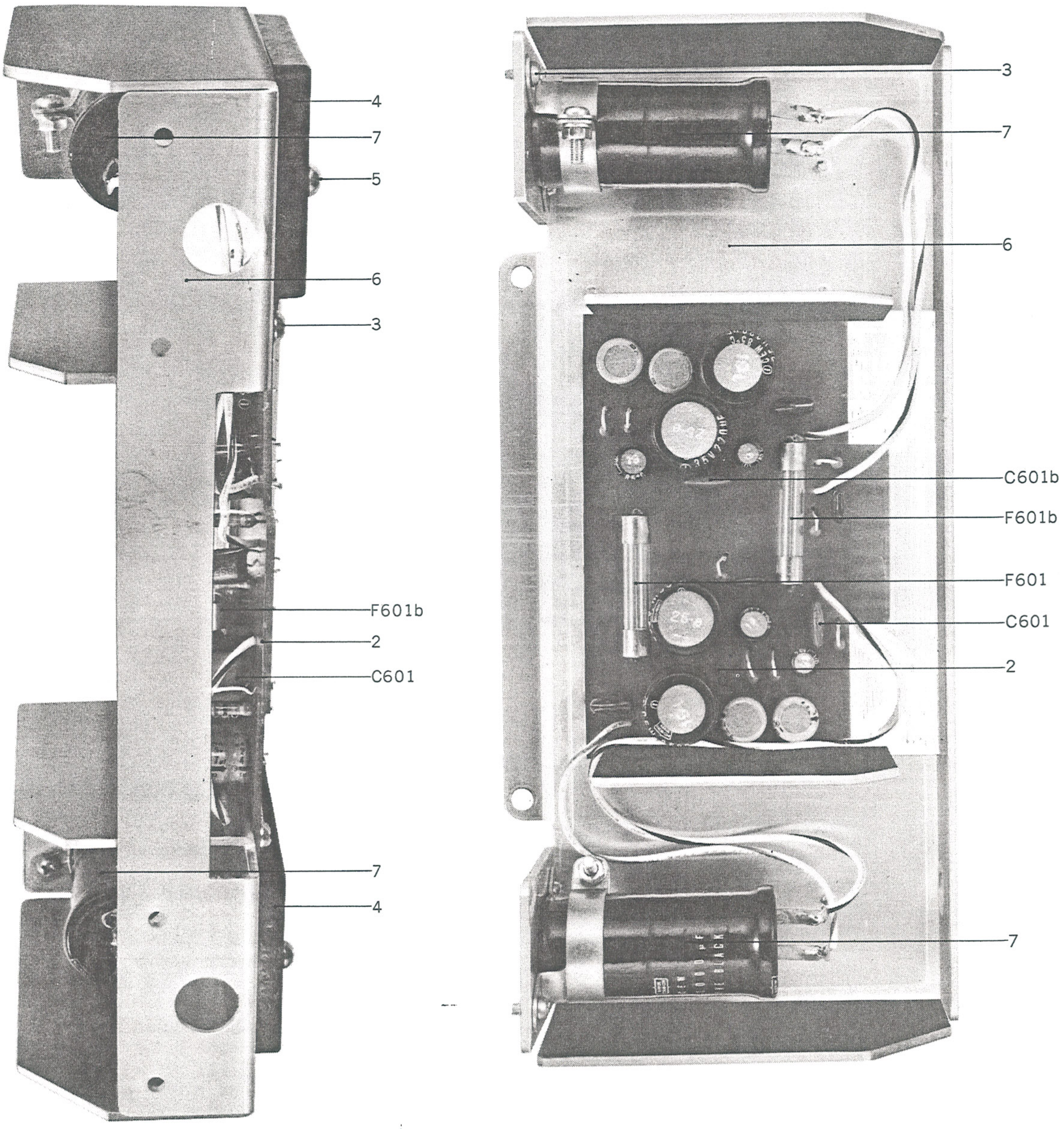
FIG. 12 PHOTO OF TONE CONTROL P.C. BOARD (MS-5028)



TONE CONTROL P.C. BOARD (MS-5028) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA426126	Tone Control P.C. Board Comp. (MS-5028)	1
12-TR701	ET398711	Transistor 2SC945(Q)(R)	2
12-VR701	EV424743	Dual-axial 4-throw Volume KJ-60R 50kAx4	1
		Capacitor, Vertical Type	
12-C701	EC320051	Elect. 10μF 16WV	2
12-C702	EC220994	Elect. 10μF 25WV	2
12-C703	EC368335	Mylar 0.022μF(J) 50WV	2
12-C704	EC250683	Mylar 0.0022μF(J) 50WV	2
12-C705	EC438041	Mylar 0.082μF(J) 50WV	2
12-C706	EC329861	Mylar 0.027μF(J) 50WV	2
		Resistor, Stopper Type	
12-R701	ER212264	Carbon RD1/4 22k(J)	2
12-R702	ER429996	Carbon RD1/4 470k(J)	2
12-R703,4	ER336442	Carbon RD1/4 10k(J)	4
12-R705	ER357456	Carbon RD1/4 2.2k(J)	2
12-R706	ER306360	Carbon RD1/4 6.8k(J)	2

FIG. 13 PHOTO OF MAIN AMP. BLOCK



MAIN AMP. BLOCK

Symbol No.	Parts No.	Description	Q'ty
13-1x	BA432742	Main Amp. Block Comp.	1
13-2	BA426183	Main Amp. P.C. Board Comp. (MS-5024)	1
13-3	ZW200687	Tapping Screw #2 3x6 (round)	8
13-4	EI425193	Power Amp. I.C. STK-015	2
13-5	ZW325056	Tapping Screw #2 3x12 (round)	4
13-6	EZ425204	Main Amp. Head-sink	1
13-7	EC233100	Elect. 1000μF 35WV (Lug. type)	2
		MAIN AMP. P.C. BOARD (MS-5024) BLOCK	
13-2	BA426183	Main Amp. P.C. Board Comp. (MS-5024)	1
13-F601	EF460653	Fuse ST-1 1A	2

Symbol No.	Parts No.	Description	Q'ty
		Capacitor, Vertical Type	
13-C601	EC337487	Hi-Q 470PF(J) 50WV	2
13-C602	EC331705	Elect. 22μF 16WV	2
13-C603	EC220678	Elect. 47μF 25WV	2
13-C604	EC372148	Elect. 220μF 35WV	2
13-C605	EC251291	Mylar 0.1μF(K) 50WV	2
13-C606	EC220678	Elect. 47μF 25WV	2
13-C607	EC324538	Elect. 330μF 25WV	2
13-C608	EC350684	Elect. 22μF 25WV	2
13-C610	EC308711	Mylar 0.047μF(K) 50WV	2
		Resistor, Stopper Type	
13-R601	ER336442	Carbon RD1/4 10k(J)	2
13-R602	ER361642	Carbon RD1/4 47(J)	2
13-R603	ER357456	Carbon RD1/4 2.2k(J)	2
13-R604	ER399723	Carbon RD1/4 4.7(J)	2

FIG. 14 PHOTO OF OSC. P.C. BOARD (MS-5025)

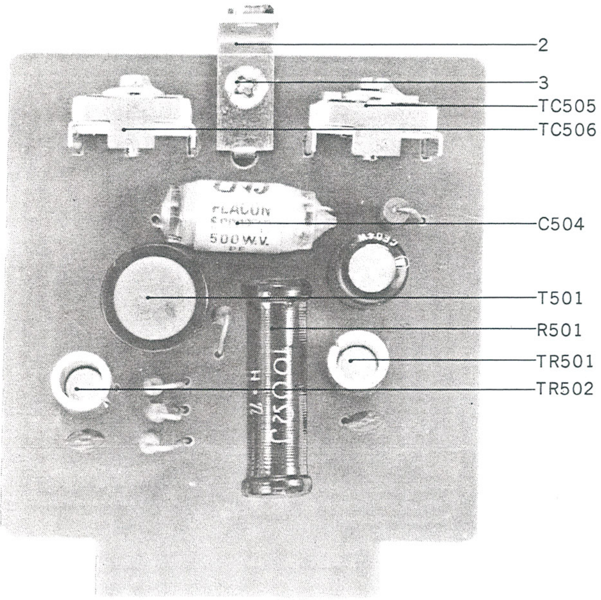
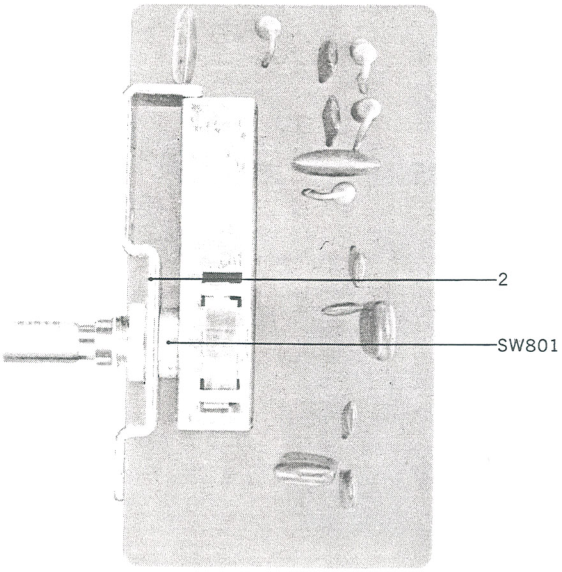


FIG. 15 PHOTO OF EQUALIZER P.C. BOARD (MS-5027)



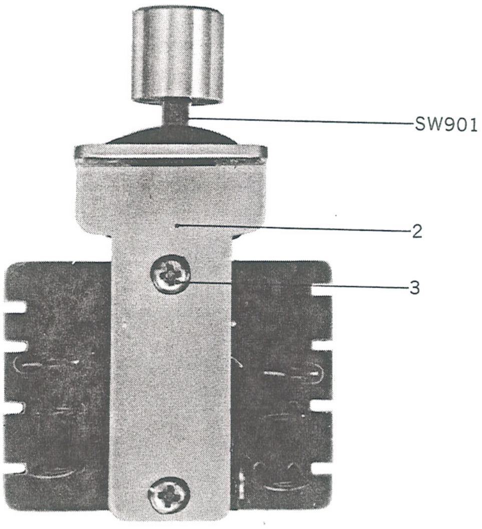
OSC. P.C. BOARD (MS-5025) BLOCK

Symbol No.	Parts No.	Description	Q'ty
14-1x	BA426194	OSC. P.C. Board Comp. (MS-5025)	1
14-TR501,2	ET304255	Transistor 2SC971(2)(3) (Red)	2
14-T501	EO383365	OSC. Coil OT-204	1
14-TC505,6	EC425250	Trimmer Condenser A-1P3-3 70PF	2
14-2	EZ425226	P.C. Board Retaining Metal	1
14-3	ZW413155	Screw, binding head 3x6	1
14-4x	ZW273756	Nut, M3	1
14-5x	ZW780401	Nut, M3	1
		Capacitor, Vertical Type	
14-C501	EC220151	Elect. 100μF 25WV	1
14-C502,3	EC250841	Mylar 0.01μF(J) 50WV	2
14-C504	EC520492	Styrol 5600PF(J) 50WV (Tub. type)	1
		Resistor, Stopper Type	
14-R501	ER425237	Wire-wound 3WL 100(J) (L type)	1
14-R502,3	ER315944	Carbon RD1/4 3.3(J)	2
14-R504	ER212883	Carbon RD1/4 4.7k(J)	1
14-R505	ER304402	Carbon RD1/4 470(J)	1
14-R506	ER538536	Carbon RD1/2 3.9k(J) (Insu. type)	1

EQUALIZER P.C. BOARD (MS-5027) BLOCK

Symbol No.	Parts No.	Description	Q'ty
15-1x	BA426115	Equalizer P.C. Board Comp. (MS-5027)	1
15-SW801	ES424710	Rotary Switch SRG-R083	1
15-2	EZ424721	Equalizer Switch Base	1
		Capacitor, Vertical Type	
15-C801	EC250683	Mylar 0.0022μF(J) 50WV	1
15-C802	EC336216	VFM 330PF(J) 50WV	1
15-C803	EC250683	Mylar 0.0022μF(J) 50WV	1
15-C804	EC336216	VFM 330PF(J) 50WV	1
15-C805	EC424708	Mylar 0.0018μF(J) 50WV	1
15-C806	EC411827	Mylar 0.0082μF(J) 50WV	1
15-C807	EC368357	Mylar 0.056μF(J) 50WV	1
15-C808	EC424708	Mylar 0.0018μF(J) 50WV	1
15-C809	EC411827	Mylar 0.0082μF(J) 50WV	1
15-C810	EC368357	Mylar 0.056μF(J) 50WV	1
		Resistor, Stopper Type	
15-R801	ER213030	Carbon RD1/4 5.6k(J)	1
15-R802	ER420322	Carbon RD1/4 36k(J)	1
15-R803	ER213030	Carbon RD1/4 5.6k(J)	1
15-R804	ER420322	Carbon RD1/4 36k(J)	1

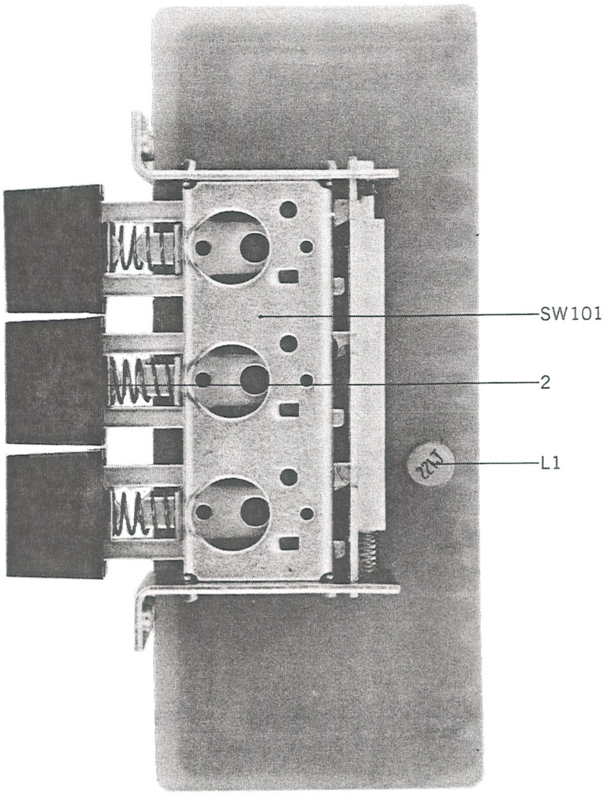
FIG. 16. PHOTO OF SRT P.C. BOARD (MS-5029)



SRT P.C. BOARD (MS-5029) BLOCK

Symbol No.	Parts No.	Description	Q'ty
16-1x	BA426093	SRT P.C. Board Comp. (MS-5029)	1
16-SW901	ES426971	Push Switch UEG-62L, without Knob	1
16-2	EZ424653	SRT Holder	1
16-3	ZW375107	Screw, pan head 2.6x4	2
		Capacitor, Vertical Type	
16-C901,2	EC368357	Mylar 0.056μF(J) 50WV	2
16-C903,4	EC311793	Mylar 0.012μF(J) 50WV	2
16-C905,6	EC250841	Mylar 0.01μF(J) 50WV	2

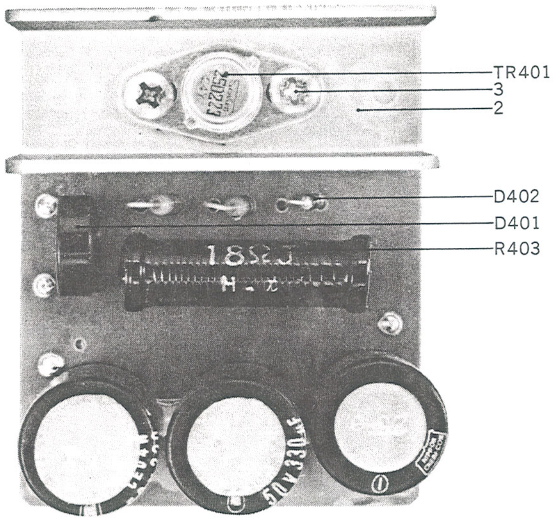
FIG. 17 PHOTO OF TRACK SELECTOR P.C. BOARD (MS-5055)



TRACK SELECTOR P.C. BOARD (MS-5055) BLOCK

Symbol No.	Parts No.	Description	Q'ty
17-1x	BA426104	Track Selector P.C. Board Comp. (MS-5055)	1
17-SW101	ES448053	Push Switch SPT-034A13	1
17-L1	EO374681	Ferri Inductor FL7H 220μH(K)	1
17-2	SK383095	TUM Knob	3

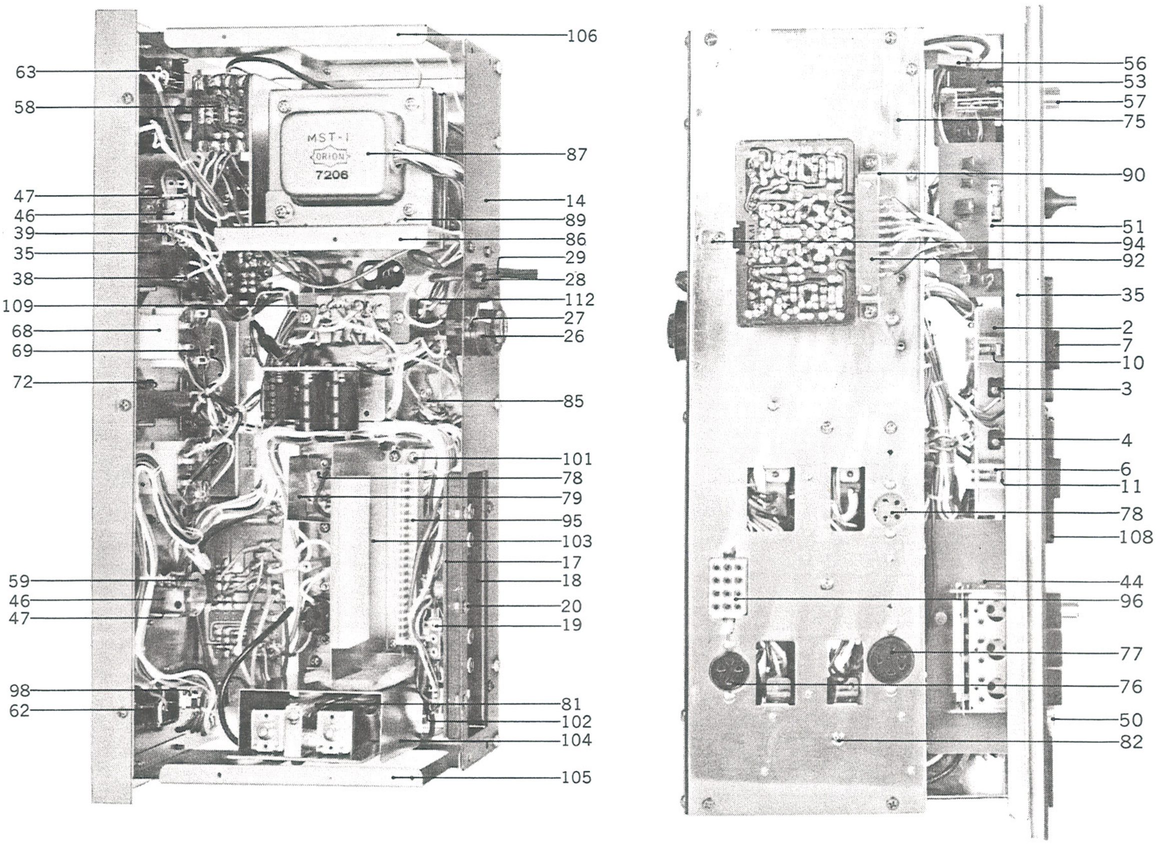
FIG. 18 PHOTO OF POWER SUPPLY P.C. BOARD (MS-5030)



POWER SUPPLY P.C. BOARD (MS-5030) BLOCK

Symbol No.	Parts No.	Description	Q'ty
18-1x	BA426150	Power Supply P.C. Board Comp. (MS-5030)	1
18-TR401	ET424833	Transistor 2SD223(Y)(G)	1
18-D401	ED329130	Silicon Diode 10DC-1(black)	1
18-D402	ED511918	Zener Diode WZ-240	1
18-2	EZ315426	Heat-sink Plate	1
18-3	ZW413741	Screw, binding head 3x8	2
18-4x	ZW273756	Nut, M3	2
		Capacitor, Vertical Type	
18-C401,2	EC403468	Elect. 330μF 50WV	2
18-C403	EC324538	Elect. 330μF 25WV	1
		Resistor, Stopper Type	
18-R401	ER212883	Carbon RD1/4 4.7k(J)	1
18-R402	ER361642	Carbon RD1/4 47(J)	1
18-R403	ER413717	Wire-wound 3WL 18(J) (L type)	1

FIG. 19 PHOTO OF AMPLIFIER ASSEMBLY BLOCK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AMPLIFIER ASSEMBLY BLOCK

DS SWITCH BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
19-1x	BZ426082	DS Switch Block Comp.	MS	1
19-2	EZ424574	DS Switch Table	MS-5002	1
19-3	ES424585	Leaf Switch A LSA-1127A (Right)	25-10-2	1
19-4	ES424596	Leaf Switch B LSA-1127B (Left)	25-10-3	1
19-5x	ZW355601	Screw, binding head 2x5		2
19-6	EZ424607	Direction Change Plate	MS-5003	2
19-7	SB424618	Direction Change Bottun	MS-5004	2
19-8x	ZW424620	Screw, pan head 3x10		2
19-9x	ZW388618	Spring Washer	CS-2054	2
19-10	ZG388607	Function Spring B	CS-2053	2
19-11	ZW391206	Spring Washer B	CS-2054B	2

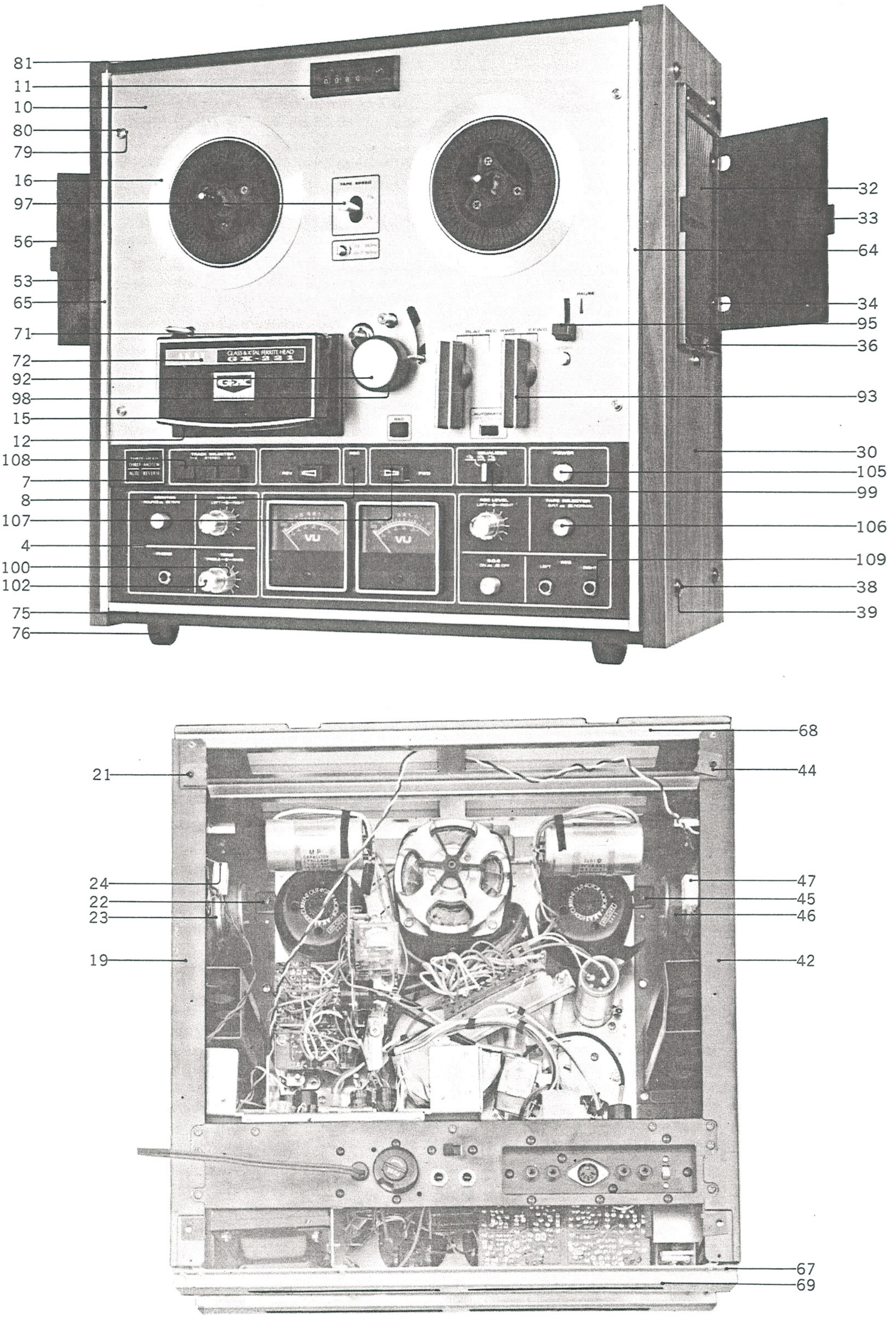
REAR PANEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
19-12x	SP432606	Rear Panel Block Comp. (Deck)	MSD	1
19-13x	BZ426137	Rear Panel Block Comp. (GX-221)	MSA	1
19-14	EZ424776	Rear Chassis B	MS-5031	1
19-15x	EZ424765	Rear Chassis A (GX-221)	MS-5031	1
19-16x	BZ426148	Jack Plate Block Comp.	MS	1
19-17	EZ373511	DPS Terminal Plate	31-5-23	1
19-18	EZ424787	Jack Plate Holder	MS-5009	1
19-19	EJ331435	Lug Plate VB2L	33-4-6	1
19-20	ZW383951	Screw, truss head 3x5(black)		5
19-21x	ZW273756	Nut, M3		5
19-22x	EJ378966	Mic. Jack 2PMJ2 (GX-221)	31-2-26	2
19-23x	ZW224976	Jack Thin Washer	DX-509	2
19-24x	ZW375153	E Jack Nut		2
19-25x	ES375478	Slide Switch ESD-279DU (GX-221)	25-3-23	1
19-26	EJ233370	Power Plug Socket S-18010	40-2-3	1
19-27	ZW372025	ISO Screw, truss head 3x6		2
19-28	EZ382263	Strain Relief SR-4K-4	2-7-12	1
19-29	EZ374894	U/L AC Cord 3M	26-3-19	1
19-30x	EF338387	Fuse ST-2 1.5A	39-1-26	1
19-31x	EF424811	Fuse ST-2 2.5A (GX-221)	39-1-26	1

SUB PANEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
19-32x	BZ487214	Sub Panel Block Comp. (GX-225D)		1
19-33x	BZ487236	Sub Panel Block Comp. (GX-221D)		1
19-34x	BZ487225	Sub Panel Block Comp. (GX-221)		1
19-35	SP487653	Sub Panel C (GX-225D)	MS-5001	1
19-36x	SP424462	Sub Panel B(GX-221D)	MS-5001	1
19-37x	SP424451	Sub Panel A (GX-221)	MS-5001	1
19-38	EJ331435	Lug Plate VB2L	33-4-6	1
19-39	EJ255115	Lug Plate VB2L2	33-4-3	1
19-40x	ER329308	Carbon/R. RD1/4 47k(J) (Insu. type)	R3,4	2
19-41x	ER345712	Carbon/R. RD1/4 22k(J) (Insu. type)	R1,2	2
19-42x	EA388574	Lamp P.C. Board (Rec.)	CS-1138	1
19-43x	EL295312	No. 2 Lamp 8V 0.2A(Rec.)	28-2-8	1
19-44	BA426104	Track Selector P.C. Board Comp. (MS-5055)		1
19-45x	BZ426082	DS Switch Comp. MS		1
19-46	ES374051	Push Switch UEG-22CP	25-5-26	2
19-47	EZ424517	Switch Holder	MS-5006	2
19-48x	ZW432843	Screw, pan head 2.6x4		2
19-49x	ZW323728	Screw, binding head 3x5		4
19-50	SK487675	Knob C	CG-2007	4
19-51	BA426115	Equalizer P.C. Board Comp. (MS-5027)		1
19-52x	ZW323728	Screw, binding head 3x5		2
19-53	ES469541	Push Switch JB-52	25-5-60	1
19-54x	MZ397394	Power Switch Table	KD-2028	1
19-55x	ZW371856	ISO Screw, binding head 3x5		2
19-56	ER376413	Spark Quencher U/L 0.033μ+120 500WV	41-1-37	1
19-57	SK487697	Knob B	CG-2007	1
19-58	BA426093	SRT P.C. Board Comp. (MS-5029)		1
19-59	EV487822	Volume V24N 50 kA	36-2-28	2
19-60x	EV398575	Double/Vol. (FR.) DJ20A 50kx2 (GX-221)	36-3-25	2
19-61x	BA426126	Tone Control P.C. Board Comp. (MS-5028)		1
19-62	EJ391083	Mic. Jack 3PMJ1P	31-2-28	1
19-63	EJ391094	Mic. Jack 2PMJ1P	31-2-27	2
19-64x	EZ225180	Nylon Collar, Jack	LD-520	3
19-65x	ZW488946	Washer (Lumilar) D9.2x18x0.25t		3
19-66x	ZW375153	E Jack Nut		3
19-67x	ZW260368	Washer (Fiber) D9.2x18x0.5t		1
19-68	EM487710	VU Meter KL-251A-7 (GX-225D)	46-1-58	2
19-69	EA487708	VU P.C. Board	MS-5209	2
19-70x	EM424484	VU Meter KPM-7E (GX-221/D)	46-1-39	2
19-71x	ZW424495	Washer (SPC) D3.1x8x1t		4
19-72	ZG290878	VU Meter Spring	DX-504	4
19-73x	ZW348107	ISO Nut, M3		4
19-74x	EL295312	No. 2 Lamp 8V 0.2A	28-2-8	2
19-75	EZ424225	Amp. Chassis	MS-5008	1
19-76	EJ426532	4P Socket S-I6303	31-1-59	1
19-77	EJ277108	5P TV-Consent-Socket	31-1-19	1
19-78	EJ298607	4P Jack	31-1-10	1
19-79	EZ426576	Connector Shield	MS-5016	1
19-80x	ZW200687	Tapping Screw #2 3x6(round)		1
19-81	EZ411276	P.C. Board Retaining Metal Prop	LF-5011	2
19-82	ZW417025	Screw, binding head 3x8, w/washer		2
19-83x	ED224572	Silicon Diode 5B2 (GX-221)	45-2-20	1
19-84x	EC401580	Elect./C. 2200μF 50WV (Lug type) (GX-221)	24-10-44	1
19-85	EJ255082	Lug Plate VBL2	33-4-10	1
19-86	EZ424260	Trans. Hanger	MS-5013	1
19-87	BT424282	Power Trans. MST-1 (Deck)	38-4-121	1
19-88x	BT424271	Power Trans. MST-3 (GX-221)	38-4-122	1
19-89	ZW200700	Tapping Screw #2 4x8 (round)		4
19-90	EZ487080	Multi Holder (MS-2)	MS-5211	1
19-91x	EZ424304	Multi Holder (GX-221)	MS-5017	1
19-92	EJ292961	10P Multi-Jack 500-010-005	31-4-4	2
19-93x	ZW487091	Screw, pan head 2.3x8		2
19-94	EZ487315	NRP Holder	MS-5210	1
19-95	EJ347670	22P Multi-Jack-3 3250-022-001S	31-4-13	2
19-96	EJ293073	12P Mate-N-Lock Plug Housing 1-480275-0	52-1-1	1
19-97x	EJ373634	Socket Contact 61115-1	52-1-1	12
19-98	ES374051	Push Switch UEG-22CP	25-5-26	1
19-99x	EZ424517	Switch Holder	MS-5006	1
19-100x	ZW432843	Screw, pan head 2.6x4		1
19-101	ZW200665	Tapping Screw #2 3x10 (round)		4
19-102	EZ487203	Multi Hanger	MS-5212	1
19-103	EZ424236	Pre-amp. Shield	MS-5014	1
19-104	EZ424258	OSC Shield	MS-5015	1
19-105	EZ424326	Side Chassis A (Right)	MS-5012	1
19-106	EZ424337	Side Chassis B (Left)	MS-5012	1
19-107x	EZ411287	P.C. Board Retaining Metal	LF-5027	1
19-108	EZ487258	VU Meter Escutcheon A	MS-5203	2
19-109	EA487350	HT P.C. Board	MS-5216	1
19-110x	BT247746	Head Phone Trans. N19-228S	38-2-11	2
19-111x	ZW323728	Screw, binding head 3x5		4
19-112	MH223108	Prop	XR-326	2

FIG. 20 PHOTO OF FINAL ASSEMBLY BLOCK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GX-221
TAPE SPEED
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TRACK SELECTOR
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FINAL ASSEMBLY BLOCK

AMP. PANEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
20-1x	BZ487271	Amp. Panel Block Comp. (GX-221)		1
20-2x	BZ487282	Amp. Panel Block Comp. (GX-221D)		1
20-3x	BZ487260	Amp. Panel Block Comp. (GX-225D)		1
20-4	SP487732	Amp. Panel D GX-221	MS-5018	1
20-5x	SP487743	Amp. Panel E GX-221D	MS-5018	1
20-6x	SP487721	Amp. Panel C GX-225D	MS-5018	1
20-7	SM487754	Amp. Panel Name Plate	MS-5202	1
20-8	SZ409320	Illumination Escutcheon	61-5023	1

MECH. PANEL BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
20-9x	BZ487462	Mech. Panel Block Comp.	MS-2,3	1
20-10	SP487473	Mech. Panel C	MS-6014	1
20-11	SZ397618	Counter Escutcheon	KD-6008	1
20-12	SZ487440	Head Cover Table A	MS-6203	1
20-13x	SZ425070	Head Cover Prop	MS-6016	2
20-14x	ZW200384	Screw, countersunk head 3x6		2
20-15	ZW425125	Screw, oval countersunk head 3x6		2
20-16	SZ435082	Panel Ring	KD-A6004	2

SIDE PLATE (RIGHT) BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
20-17x	BZ432461	Side Plate (Right) Block Comp. (GX-221)		1
20-18x	BZ432527	Side Plate (Right) Block Comp. (Deck)		1
20-19	SZ424901	Side Wall B (GX-221)	MS-6001	1
20-20x	SZ540281	Side Wall B2 (Deck)	MS-6001	1
20-21	ZW290250	U type Speed Nut, M4 #1 (large)	6-3-2	2
20-22	ZW290248	U type Speed Nut, M4 #1 (small)	6-3-2	2
20-23	SS391342	Speaker SK-2187E (GX-221)	29-5-9	1
20-24	ER364713	Cement/R. 5W 27(K) (Wire-wound type)	35-16-3	1
20-25x	ZW355487	Screw, binding head 3x10		4
20-26x	ZW425002	Washer (SPC) D3.1x8x0.5t		4
20-27x	ZW273756	Nut, M3		8
20-28x	MZ447592	L Metal Fitting B	MS-6039	1
20-29x	ZW447840	Tapping Screw #2 3x8(BR)		2
20-30	SZ424923	Side Plate A (GX-221)	MS-6003	1
20-31x	SZ424934	Side Plate B (Deck)	MS-6003	1
20-32	SZ424945	Speaker Grill (GX-221)	MS-6004	1
20-33	SZ424967	Reflection Plate (GX-221)	MS-6006	1
20-34	SZ237508	Reflection Plate Retaining Metal	3A-419	2
20-35x	ZW201183	Screw, truss head 3x8(black)		2
20-36	ZW425046	Screw 3x25 (truss), without groove		4
20-37x	ZW259593	Washer (BSP) D3.4x7.8x0.5t		4
20-38	ZW437444	Screw, oval countersunk head 4x25		5
20-39	ZW462150	Decorative Washer, M4		5

SIDE PLATE (LEFT) BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
20-40x	BZ432516	Side Plate (Left) Block Comp. (GX-221)		1
20-41x	BZ432538	Side Plate (Left) Block Comp. (Deck)		1
20-42	SZ424890	Side Wall A (GX-221)	MS-6001	1
20-43x	SZ540270	Side Wall A2 (Deck)	MS-6001	1
20-44	ZW290250	U type Speed Nut, M4 #1 (large)	6-3-2	2
20-45	ZW290248	U type Speed Nut, M4 #1 (small)	6-3-1	2
20-46	SS391342	Speaker SK-2187E (GX-221)	29-5-9	1
20-47	ER364713	Cement/R. 5W 27(K) (Wire-wound type)	35-16-3	1
20-48x	ZW355487	Screw, binding head 3x10		4
20-49x	ZW425002	Washer (SPC) D3.1x8x0.5t		4
20-50x	ZW273756	Nut, M3		4
20-51x	MZ447996	L Metal Fitting A	MS-6039	1
20-52x	ZW447840	Tapping Screw #2 3x8(BR)		1
20-53	SZ424923	Side Plate A (GX-221)	MS-6003	1
20-54x	SZ424934	Side Plate B (Deck)	MS-6003	1
20-55x	SZ424945	Speaker Grill(GX-221)	MS-6004	1
20-56	SZ424967	Reflection Plate (GX-221)	MS-6006	1
20-57x	SZ237508	Reflection Plate Retaining Metal	3A-419	2
20-58x	ZW201183	Screw, truss head 3x8 (black)		2
20-59x	ZW425046	Screw, 3x25(truss), without groove		4
20-60x	ZW259593	Washer (BSP) D3.4x7.8x0.5t		4
20-61x	ZW437444	Screw, oval countersunk head 4x25		5
20-62x	ZW462150	Decorative Washer, M4		5

ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
20-63x	SZ425024	Panel Support	MS-6008	2
20-64	SP487506	Sash (Right), w/pin	MS-6009	1
20-65	SP487528	Sash (Left), w/pin	MS-6009	1
20-66x	ZW323728	Screw, binding head 3x5		6
20-67	ZW447772	Tapping Screw #2 3x6(BR)		20
20-68	SZ454893	Channel A	MS-6038	1
20-69	SZ454904	Channel B	MS-6041	1
20-70x	SZ433956	Head Cover Shield	MS-6035	1
20-71	SC487541	Head Cover A	MS-6204	1
20-72	SM487563	Head Cover Name Plate GX-221	MS-6205	1
20-73x	SM487574	Head Cover Name Plate GX-221D	MS-6205	1
20-74x	SM487552	Head Cover Name Plate GX-225D	MS-6205	1
20-75	SZ425160	Bottom Plate	MS-6021B	1
20-76	SZ377190	LM Rubber Foot	LM-404	8
20-77x	ZW419646	Washer (SPC) D4.5x9.8x0.5t		8
20-78x	ZW487776	Screw, truss head 4x18		4
20-79	ZW408418	Panel Washer	KD-6029	4
20-80	ZW411660	Screw, oval countersunk head 3x6		4
20-81	SZ425171	Upper Plate (Ceiling)	MS-6021	1
20-82x	ZW463037	Washer, M3 (Mountain type)		4
20-83x	ZW425125	Screw, oval countersunk head 3x6 (black)		4
20-84x	SZ425316	Change Name Plate	MS-6024	1
20-85x	ZW432944	Push Nut 3x10x0.3t		1
20-86x	ZW332065	Lock Screw	MR-648	1
20-87x	ZW259514	Washer (Nylon) D3.1x8x1t		1
20-88x	SZ488801	Back Cover A-1 (GX-221)	MS-6023	1
20-89x	SZ488812	Back Cover D-1 (Deck)	MS-6023	1
20-90x	ZW462194	Tapping Screw #2 3x8(pan), w/washer		4
20-91x	ZW200643	Tapping Screw #1 4x25(truss)		4
20-92	SK425158	Pinch Roller Cap	MS-6020	1
20-93	SK487585	Mech. Knob A	MS-6206	2
20-94x	ZW253405	Mech. Knob Screw	7-1-46	2
20-95	SK476752	Pause Knob	MR-612	1
20-96x	ZW433001	Set Screw, hexagon socket 3x5 (cup)		1
20-97	SK409498	Lever Switch Knob A, B	61-5027,8	1
20-98	MP271170	LC Pinch Roller	LC-321	1
20-99	SK487293	Equalizer Knob	MS-5206	1
20-100	SK487326	Volume Knob A (GX-221)	MS-5303	3
20-101x	ZW200766	Set Screw 3x5 (cup)		3
20-102	SK487337	Volume Knob B (GX-221)	MS-5304	3
20-103x	ZW200733	Set Screw 3x4 (cup)		3
20-104x	SK476111	Amp. Knob (Deck)	MR-6010	2
20-105	SK487697	Knob B	CG-2007	1
20-106	SK487675	Knob C	CG-2007	4
20-107	SB424618	Direction Change Bottun	MS-5004	2
20-108	SK383095	TUM Knob	RD-A507	3
20-109	EZ424383	Collar, Jack	MS-5032	3
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20-111x	EF394773	Fuse 2A 250V	39-1-39	1
20-112x	EF338387	Fuse ST-2 1.5A	39-1-26	1
20-113x	EF304626	Fuse ST-4 1A	39-1-28	1

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MZ316945	5-8
MZ316956	5-10
MZ316967	5-17
MZ316978	5-19
MZ317024	5-30
MZ317046	5-26
MZ317373	2-21
MZ317373	6-54
MZ317406	2-32
MZ317406	6-145
MZ337724	3-19x
MZ339388	6-66x
MZ364691	5-21
MZ373318	5-27x
MZ381701	6-123
MZ397394	19-54x
MZ404820	3-30x
MZ425338	6-37
MZ425384	6-39
MZ425744	6-45
MZ425755	6-48
MZ425766	6-80
MZ425801	6-109
MZ425902	6-81
MZ425935	5-25
MZ425946	5-34
MZ446635	4-7
MZ447592	20-28x
MZ447996	20-51x
MZ448222	3-2
SB316754	6-10
SB424618	19-7
SB424618	20-107
SB485741	6-77
SC487541	20-71
SK383095	17-2
SK383095	20-108
SK409498	20-97
SK425158	20-92
SK476111	20-104x
SK476752	20-95
SK487293	20-99
SK487326	20-100
SK487337	20-102
SK487585	20-93
SK487675	19-50
SK487675	20-106
SK487697	19-57
SK487697	20-105
SM487552	20-74x
SM487563	20-72
SM487574	20-73x
SM487754	20-7
SP424451	19-37x
SP424462	19-36x
SP432606	19-12x
SP487473	20-10
SP487506	20-64
SP487528	20-65
SP487653	19-35
SP487721	20-6x
SP487732	20-4
SP487743	20-5x
SS391342	20-23
SS391342	20-46
SZ237508	20-34
SZ237508	20-57x
SZ377190	20-76
SZ397618	20-11
SZ409320	20-8
SZ424890	20-42
SZ424901	20-19
SZ424923	20-30
SZ424923	20-53
SZ424934	20-31x
SZ424934	20-54x
SZ424945	20-32
SZ424945	20-55x
SZ424967	20-33
SZ424967	20-56
SZ425024	20-63x
SZ425070	20-13x
SZ425160	20-75
SZ425171	20-81
SZ425316	20-84x
SZ433956	20-70x
SZ435082	20-16
SZ454893	20-68
SZ454904	20-69
SZ487440	20-12
SZ488801	20-88x
SZ488812	20-89x
SZ540270	20-43x
SZ540281	20-20x
UC250536	6-57
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ZG217337	3-24
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ZG217394	6-151
ZG225516	5-29

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ZG301061	6-139
ZG303300	1-57
ZG314706	6-73
ZG314818	6-89
ZG315011	1-58
ZG315011	2-29
ZG315011	6-117
ZG316732	6-5
ZG316765	6-12
ZG317114	6-28
ZG317496	2-16
ZG317766	1-38
ZG317902	1-43
ZG388607	19-10
ZG425531	1-55
ZG432371	6-41
ZG437253	6-35
ZG455692	6-106
ZW200384	20-14x
ZW200417	1-37
ZW200441	6-27
ZW200643	20-91x
ZW200665	19-101
ZW200687	6-70x
ZW200687	13-3
ZW200687	19-80x
ZW200700	19-89
ZW200733	20-103x
ZW200766	20-101x
ZW201183	20-35x
ZW201183	20-58x
ZW201475	1-48
ZW201745	3-6
ZW202116	6-64x
ZW202116	6-95x
ZW202252	1-16
ZW202691	1-54
ZW203016	3-10
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ZW217877	6-137
ZW224976	19-23x
ZW228025	3-3x
ZW228036	3-4x
ZW228194	3-5x
ZW231805	6-22
ZW244710	4-8
ZW253405	20-94x
ZW257477	1-20
ZW259514	20-87x
ZW259593	20-37x
ZW259593	20-60x
ZW259830	6-11x
ZW259885	6-23
ZW259942	5-11x
ZW259975	6-102x
ZW260054	3-27x
ZW260054	6-15x
ZW260087	6-99
ZW260144	6-33x
ZW260368	19-67x
ZW270088	1-21
ZW270088	2-9
ZW270088	6-42x
ZW270088	6-134x
ZW272395	3-17
ZW273688	6-58x
ZW273756	14-4x
ZW273756	18-4x
ZW273756	19-21x
ZW273756	20-27x
ZW273756	20-50x
ZW273778	1-12
ZW273778	2-13x
ZW273778	6-124x
ZW273881	1-63
ZW273914	4-23
ZW274026	6-52x
ZW290248	20-22
ZW290248	20-45
ZW290250	20-21
ZW290250	20-44
ZW290283	1-45
ZW290283	2-30
ZW290283	3-28x
ZW290283	5-13
ZW290283	6-7x
ZW290283	6-34x
ZW290283	6-88
ZW290294	6-148
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ZW314728	6-78x
ZW314943	6-111x
ZW316800	6-19x
ZW317711	1-28
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ZW317913	1-44
ZW321298	5-28x
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ZW323728	1-72
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ZW323728	19-52x
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ZW325056	13-5
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ZW330445	6-85x
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ZW371856	19-55x
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ZW375107	16-3
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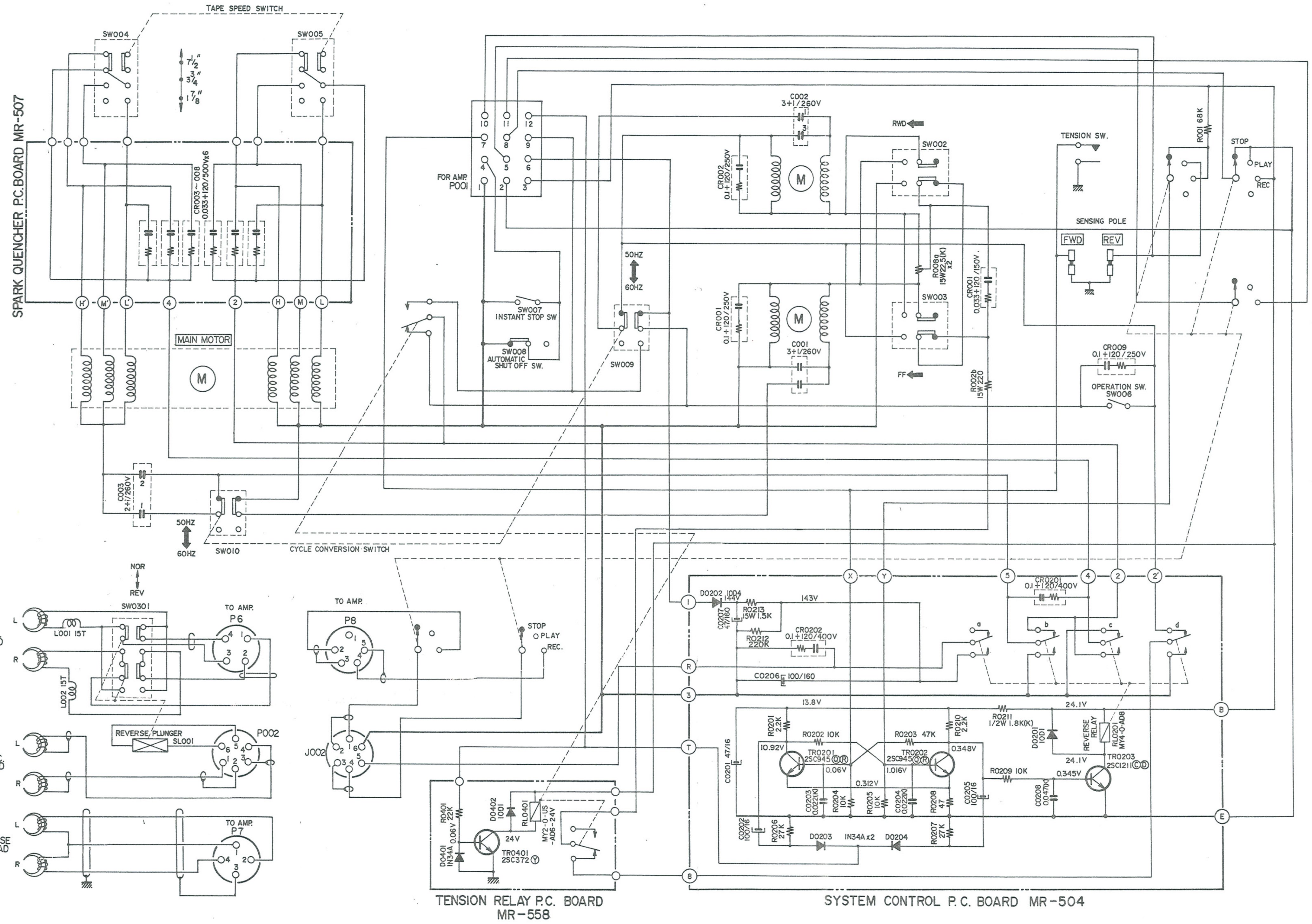
ZW375153	19-66x
ZW383343	6-20
ZW383951	19-20
ZW384131	5-36
ZW384840	1-74
ZW388618	19-9x
ZW391206	19-11
ZW392681	4-16
ZW393232	4-20
ZW396786	1-10
ZW403312	1-51
ZW408418	20-79
ZW411660	20-80
ZW413155	14-3
ZW413188	1-8x
ZW413188	2-22x
ZW413188	5-32
ZW413188	6-103
ZW413201	4-22
ZW413201	5-14
ZW413201	6-49x
ZW413223	1-26
ZW413223	1-71
ZW413223	5-20
ZW413223	5-41
ZW413223	6-108x
ZW413267	6-56x
ZW413278	6-53x
ZW413280	4-19
ZW413728	5-9x
ZW413741	18-3
ZW413998	4-21
ZW414044	6-50x
ZW417025	1-5
ZW417025	19-82
ZW417137	2-27x
ZW417137	6-115
ZW417150	3-25
ZW419646	20-77x
ZW419826	6-92x
ZW424056	2-17
ZW424056	3-16
ZW424056	5-31
ZW424495	19-71x
ZW424620	19-8x
ZW425002	20-26x
ZW425002	20-49x
ZW425046	20-36
ZW425046	20-59x
ZW425125	20-15
ZW425125	20-83x
ZW425788	6-79
ZW425788	6-135
ZW425981	2-14x
ZW425992	2-18
ZW426622	1-50
ZW427026	3-15
ZW427048	6-125x
ZW432347	6-75x
ZW432663	1-42
ZW432674	1-17
ZW432685	1-24
ZW432696	1-34
ZW432753	6-25
ZW432843	19-48x
ZW432843	19-100x
ZW432944	6-8
ZW432944	20-85x
ZW433001	20-96x
ZW437444	20-38
ZW437444	20-61x
ZW439514	6-132x
ZW440291	6-128
ZW447208	4-4
ZW447772	20-67
ZW447840	20-29x
ZW447840	20-52x
ZW450753	1-27
ZW460157	5-4x
ZW462150	20-39
ZW462150	20-62x
ZW462194	20-90x
ZW463037	20-82x
ZW486358	6-131x
ZW487091	19-93x
ZW487776	20-78x
ZW488946	19-65x
ZW516655	2-20
ZW780401	14-5x
ZW861344	6-32x

SECTION 3

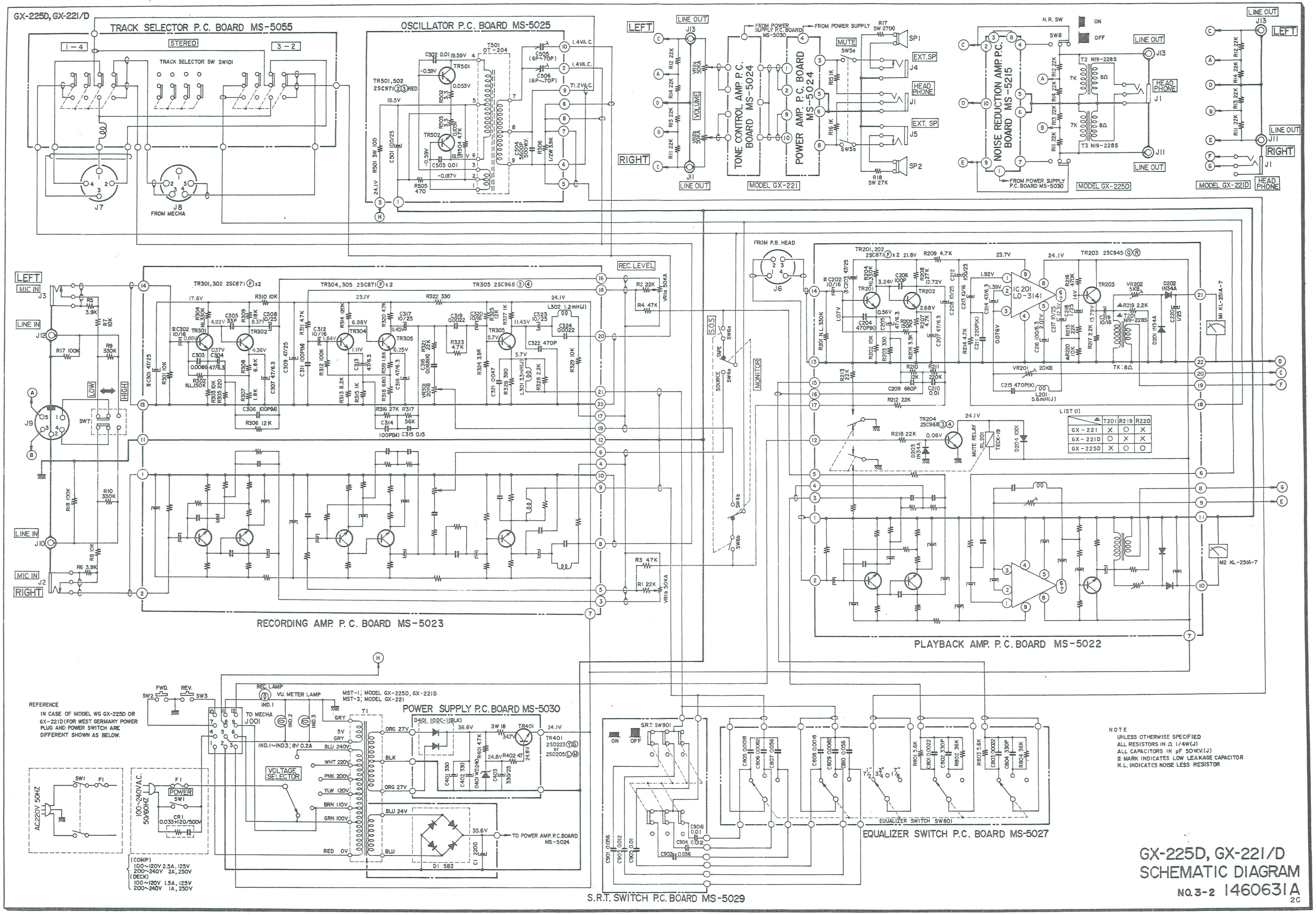
SCHEMATIC DIAGRAM

1. GX-225D SCHEMATIC DIAGRAM
2. GX-221 SCHEMATIC DIAGRAM
3. GX-221D SCHEMATIC DIAGRAM


TAPE SPEED SWITCH
SW004
SW005
7½"
3¾"
1⅞"
SPARK QUENCHER P.C.BOARD MR-507
CR003 ~ 008 0.033+120/500Vx6
MAIN MOTOR
M
C003 2+1/260V
SW010
50HZ
60HZ
CYCLE CONVERSION SWITCH
FOR AMP. P001
SW007 INSTANT STOP SW
SW008 AUTOMATIC SHUT OFF SW.
SW009
C002 3+1/260V
CR002 0.1+120/250V
CR001 0.1+120/250V
C001 3+1/260V
RWD
FF
SW002
SW003
R008a 15W22.5(K) x2
CR001 0.033+120/150V
R002b 15W 220
TENSION SW.
SENSING POLE
FWD
REV
R001 68K
STOP
PLAY
REC
CR009 0.1+120/250V
OPERATION SW. SW006
NOR
REV
SW0301
P.B. HEAD
L001 15T
L002 15T
TO AMP. P6
REVERSE PLUNGER SL001
P002
REC. HEAD
ERASE HEAD
TO AMP. P7
TO AMP. P8
J002
STOP
PLAY
REC.
D0202 10D4
C0207 47/160
R0213 15W 1.5K
143V
R0212 220K
CR0202 0.1+120/400V
C0206 100/160
CR0201 0.1+120/400V
13.8V
24.1V
R0201 2.2K
R0202 10K
R0203 47K
R0210 2.2K
R0211 1/2W 1.8K(K)
D0201 10D1
REVERSE RELAY
RL0201 MY4-0-A08
10.92V
TR0201 2SC945
TR0202 2SC945
0.348V
0.06V
0.312V
1.016V
R0209 10K
0.345V
TR0203 2SC1211
C0201 47/16
C0203 0.022(K)
R0204 10K
R0205 10K
C0204 0.022(K)
R0208 47
C0205 100/16
C0208 0.47(K)
C0202 100/16
R0206 27K
D0203
IN34A x2
D0204
R0207 27K
R0401 22K
0.06V
D0402 10D1
RL0401 MY2-0-US -A06-24V
24V
D0401 IN34A
TR0401 2SC372
TENSION RELAY P.C. BOARD MR-558
SYSTEM CONTROL P.C. BOARD MR-504

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)

GX-225D, GX-221/D
SCHEMATIC DIAGRAM
NO.3-1 1460630A
2C


GX-225D, GX-221/D
TRACK SELECTOR P.C. BOARD MS-5055
STEREO
1-4
3-2
TRACK SELECTOR SW SW101
J7
J8
FROM MECHA
OSCILLATOR P.C. BOARD MS-5025
TR501,502 2SC971
TR501
TR502
T501 OT-204
LEFT
RIGHT
LINE OUT
J13
J11
VOLUME
TONE CONTROL AMP. P.C. BOARD MS-5024
POWER AMP. P.C. BOARD MS-5024
FROM POWER SUPPLY P.C. BOARD MS-5030
FROM POWER SUPPLY
MUTE
SW5a
SW5b
EXT. SP
HEAD PHONE
SP1
SP2
J4
J1
J5
MODEL GX-221
N.R. SW
SW8
ON
OFF
NOISE REDUCTION AMP. P.C. BOARD MS-5215
T2 N19-228S
T3 N19-228S
FROM POWER SUPPLY P.C. BOARD MS-5030
MODEL GX-225D
MODEL GX-221D
MIC IN
LINE IN
J3
J12
J10
J2
J9
SW7
LOW
HIGH
TR301,302 2SC871 (F) x2
TR304,305 2SC871 (F) x2
TR305 2SC968 (3)(4)
REC. LEVEL
VR1a 50KA
VR1b 50KA
S.O.S
SOURCE
TAPE
MONITOR
SW4a
SW4b
SW6a
SW6b
RECORDING AMP. P.C. BOARD MS-5023
FROM P.B. HEAD
J6
TR201,202 2SC871 (F) x2
IC201 LD-3141
TR203 2SC945 (Q)(R)
TR204 2SC968 (3)(4)
MUTE RELAY RL201 TECK-19
M1 KL-251A-7
M2 KL-251A-7
PLAYBACK AMP. P.C. BOARD MS-5022
FWD.
REV.
SW2
SW3
REC. LAMP
VU. METER LAMP
IND.1
IND.2
IND.3
IND.1~IND.3; 8V 0.2A
TO MECHA
J001
MST-1; MODEL GX-225D, GX-221D
MST-3; MODEL GX-221
POWER SUPPLY P.C. BOARD MS-5030
T1
D401 10DC-1(BLK)
TR401 2SD223 or 2SD205
VOLTAGE SELECTOR
TO POWER AMP. P.C. BOARD MS-5024
D1 S82
S.R.T. SW901
S.R.T. SWITCH P.C. BOARD MS-5029
EQUALIZER SWITCH SW801
EQUALIZER SWITCH P.C. BOARD MS-5027
AC220V 50HZ
100~240V A.C. 50/60HZ
SW1
F1
POWER
CR1 0.033+120/500V

REFERENCE

IN CASE OF MODEL WG GX-225D OR GX-221D (FOR WEST GERMANY POWER PLUG AND POWER SWITCH ARE DIFFERENT SHOWN AS BELOW.

(COMP)
100~120V 2.5A, 125V
200~240V 2A, 250V
(DECK)
100~120V 1.5A, 125V
200~240V 1A, 250V

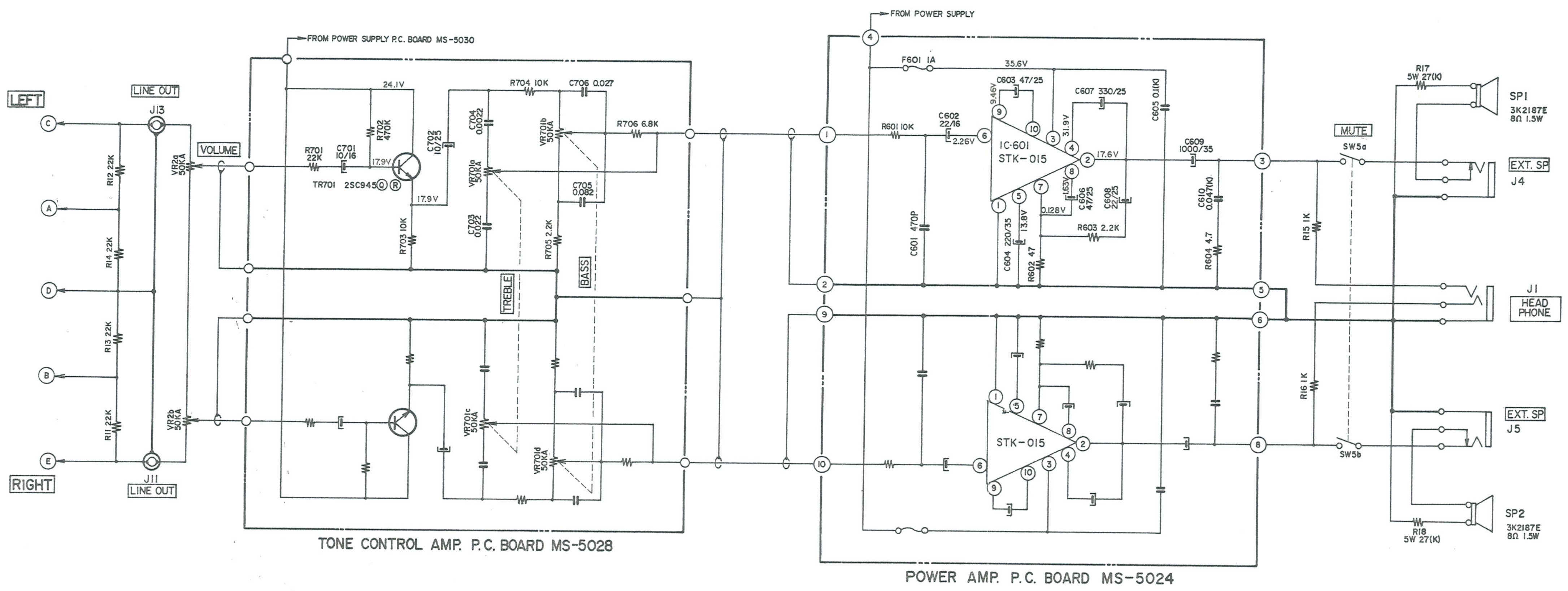
LIST (1)

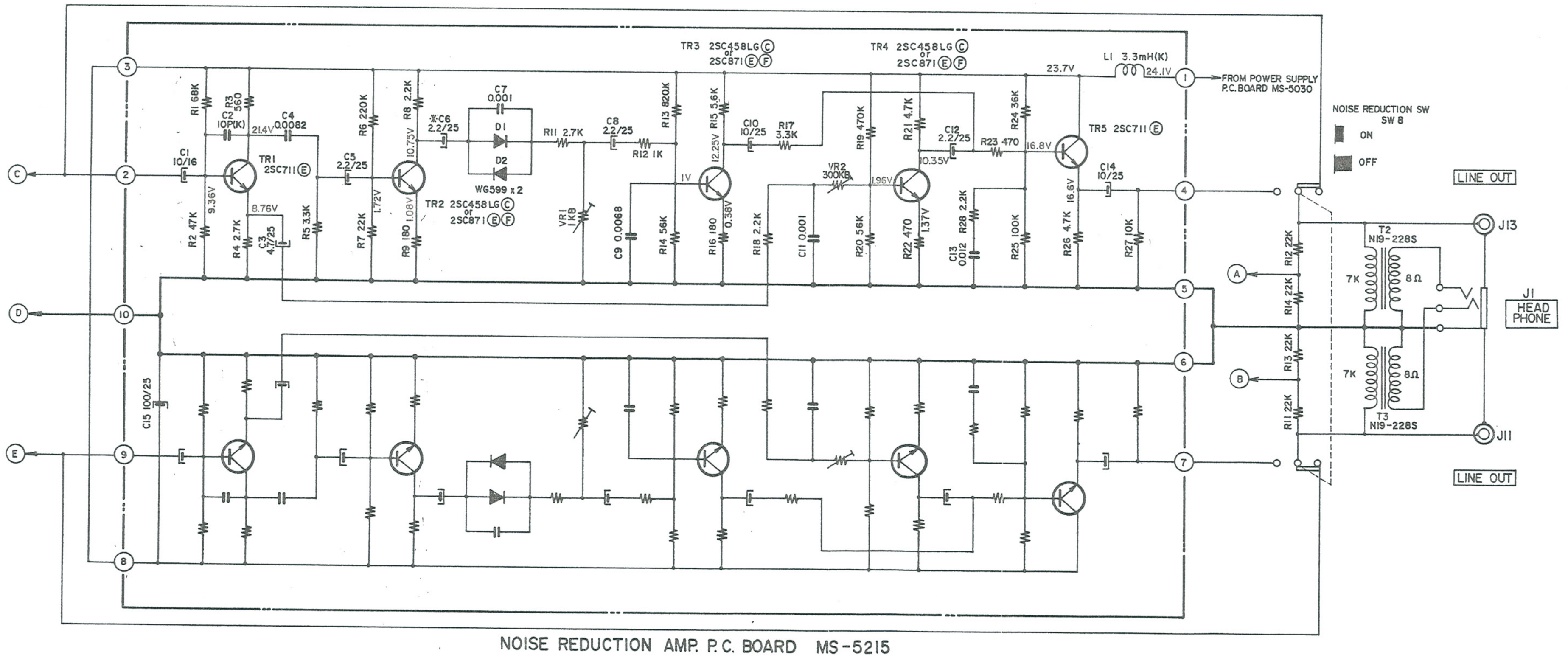
△	T201	R219	R220
GX-221	X	○	X
GX-221D	○	X	X
GX-225D	X	○	○

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
※ MARK INDICATES LOW LEAKAGE CAPACITOR
N.L. INDICATES NOISE LESS RESISTOR

GX-225D, GX-221/D SCHEMATIC DIAGRAM

NO.3-2 1460631A
2C


FROM POWER SUPPLY P.C. BOARD MS-5030
LEFT
RIGHT
LINE OUT
J13
J11
VOLUME
R12 22K
R14 22K
R13 22K
R11 22K
VR2a 50KA
VR2b 50KA
R701 22K
C701 10/16
R702 470K
C702 10/25
TR701 2SC945
17.9V
24.1V
R703 10K
R704 10K
C706 0.027
C704 0.0022
C703 0.022
VR701a 50KA
VR701b 50KA
VR701c 50KA
VR701d 50KA
C705 0.082
R705 2.2K
R706 6.8K
TREBLE
BASS
TONE CONTROL AMP. P.C. BOARD MS-5028
FROM POWER SUPPLY
F601 1A
35.6V
C603 47/25
C607 330/25
C605 0.1(K)
R601 10K
C602 22/16
2.26V
IC-601
STK-015
9.46V
31.9V
17.6V
C609 1000/35
C610 0.047(K)
R604 4.7
C601 470P
C604 220/35
R602 47
13.8V
1.63V
0.128V
C606 47/25
C608 22/25
R603 2.2K
STK-015
POWER AMP. P.C. BOARD MS-5024
R17 5W 27(K)
SP1 3K2187E 8Ω 1.5W
MUTE
SW5a
EXT. SP
J4
R15 1K
J1
HEAD PHONE
R16 1K
EXT. SP
J5
SW5b
SP2 3K2187E 8Ω 1.5W
R18 5W 27(K)


TR3 2SC458LG Ⓒ or 2SC871 Ⓔ Ⓕ
TR4 2SC458LG Ⓒ or 2SC871 Ⓔ Ⓕ
L1 3.3mH(K)
23.7V
24.1V
FROM POWER SUPPLY P.C. BOARD MS-5030
R1 68K
R3 560
C2 10P(K)
C4 0.0082
2.14V
C1 10/16
TR1 2SC711 Ⓔ
9.36V
8.76V
R2 47K
R4 2.7K
C3 4.7/25
R5 3.3K
R6 220K
C5 2.2/25
R7 22K
1.72V
R8 2.2K
TR2 2SC458LG Ⓒ or 2SC871 Ⓔ Ⓕ
10.73V
1.08V
R9 180
※C6 2.2/25
C7 0.001
D1
D2
WG599 x2
R11 2.7K
C8 2.2/25
R12 1K
VR1 1KB
C9 0.0068
R13 820K
R14 56K
1V
R15 5.6K
12.25V
0.38V
R16 180
C10 10/25
R17 3.3K
R18 2.2K
C11 0.001
VR2 300KB
1.96V
R19 470K
R20 56K
R21 4.7K
C12 2.2/25
10.35V
R22 470
1.37V
R28 2.2K
C13 0.012
R23 470
R24 36K
16.8V
R25 100K
TR5 2SC711 Ⓔ
C14 10/25
16.6V
R26 4.7K
R27 10K
C15 100/25
NOISE REDUCTION SW SW 8
ON
OFF
LINE OUT
T2 N19-228S
7K
8Ω
J13
J1
HEAD PHONE
T3 N19-228S
R12 22K
R14 22K
R13 22K
R11 22K
J11
LINE OUT
NOISE REDUCTION AMP. P.C. BOARD MS-5215

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
※ MARK INDICATES LOW LEAKAGE CAPACITOR.

GX-225D, GX-221/D
SCHEMATIC DIAGRAM

NO.3-3 1460632A

2C